SLV-ED1PL/ED4PL/ED7KR/ED8PL

RMT-V247B/V248

SERVICE MANUAL

Korean Model
SLV-ED7KR

Philippine Model
SLV-ED1PL/ED4PL/ED8PL

Ver 1.0 1998. 08

Photo: SLV-ED1PL

S MECHANISM

Hi-Fi

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENTS VI for MECHANICAL ADJUSTMENTS. (9-921-647-11)**

* The abbreviations of ED1, ED4, ED7 and ED8 contained in this service manual are indicated when these models are common to all their corresponding models as given below.

Abbreviated model name	ED1	ED4	ED7	ED8
All model names SLV-	ED1PL	ED4PL	ED7KR	ED8PL

SPECIFICATIONS

System

Format
VHS NTSC standard
Video recording system
Rotary head helical scanning FM system
Video heads
Double azimuth two heads
Video signal
NTSC color, EIA standards
Tape speed
SP: 33.35 mm/s
EP: 11.11 mm/s
LP: 16.67 mm/s, playback only
Maximum recording playback time
8 hrs. in EP mode (with T-160 tape)
Fast-forward and rewind time
Approx. 3 min. (with T-120 tape)

Tuner section

Channel coverage
VHF 2 to 13
UHF 14 to 69
CATV A-8 to A-1, A to W, W+1 to W+84
Antenna
75-ohm antenna terminal for VHF/UHF

Inputs and outputs

LINE-1 IN
VIDEO IN, phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, phono jack (1) (ED1/ED4)
AUDIO IN, phono jack (2) (ED7/ED8)
Input level: 327 mVrms
Input impedance: more than 47 kilohms
LINE-2 IN (ED7/ED8)
VIDEO IN, phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, phono jack (2)
Input level: 327mVrms
Input impedane: more than 47 kilohms
LINE OUT
VIDEO OUT, phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT, phono jack (1) (ED1/ED4)
AUDIO OUT, phono jack (2) (ED7/ED8)
Standard output: 327 mVrms
Load impedance; 47 kilohms
Output impedance: less than 10 kilohms

Timer section

Clock
Quartz locked
Timer indication
12-hour cycle
Timer setting
8 programs per month (max.)
Power back-up
Built-in self-charging capacitor
Back-up duration: up to 1 hour at a time

General

Power requirements
110 – 240 V AC, 50/60 Hz
Power consumption
19W (ED1/ED4)
22W (ED7/ED8)
Operating temperature
5 ˚C to 40 ˚C
Storage temperature
–20 ˚C to 60 ˚C

– Continued on next page –

VHS VIDEO CASSETTE RECORDER

MICROFILM

SONY®

Dimensions
Approx. 355 × 96 × 285 mm (w/h/d): (ED1)
Approx. 430 × 100 × 286 mm (w/h/d): (ED4/ED7/ED8)
including projecting parts and controls

Mass
Approx. 3.7 kg: (ED1)
Approx. 4.2 kg: (ED4/ED7/ED8)

Supplied accessories

Remote commander (1)
R6 (size AA) batteries (2)
75-ohm coaxial cable with F-type connectors (1)
Plug adaptor (1) (ED1/ED4/ED8)

Design and specifications are subject to change without notice.

- **Feature Difference**

SLV- FEATURE	ED1PL	ED4PL	ED7KR	ED8PL
HEAD/CH	2/2	4/4	4/6	4/6
RCA REAR LINE IN/OUT	○/○	○/○	○(3P)/○(3P)	○(3P)/○(3P)
RCA FRONT LINE IN	×	×	○(3P)	○(3P)
CLICK SHUTTLE	×	×	×	○
REMOTE COMMANDER RMT-	V248	V248	V247B	V247B

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are “pinched” or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

TABLE OF CONTENTS

Section *Title* *Page*

Feature Difference 2
SERVICE NOTE 4

1. GENERAL

Getting Started 1-1
Basic Operations 1-4
Additional Operations 1-7
Additional Information 1-9

2. DISASSEMBLY

2-1. Upper Case Removal 2-1
2-2. NK-11 Board Removal 2-1
2-3. Rear Panel Removal 2-1
2-4. Front Panel Section Removal 2-1
2-5. Power Block Removal 2-2
2-6. Mechanism Deck Removal 2-2
2-7. MA-323 Board Removal 2-2
2-8. Internal Views 2-3
2-9. Circuit Boards Location 2-4

3. BLOCK DIAGRAMS

3-1. Overall Block Diagram 3-1
3-2. Video1 Block Diagram 3-4
3-3. Video2 Block Diagram 3-5
3-4. Servo/System Control Block Diagram 3-7
3-5. Audio Block Diagram 3-9
3-6. Tuner Block Diagram 3-11
3-7. Mode Control Block Diagram 3-13
3-8. Power Block Diagram 3-15

4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. Frame Schematic Diagram 4-3
4-2. Printed Wiring Boards and Schematic Diagrams 4-5
  MA-323 (Head Amp) Schematic Diagram 4-5
  MA-323 Printed Wiring Board 4-9
  MA-323 (Video, Audio) Schematic Diagram 4-11
  MA-323 (System Control) Schematic Diagram 4-15
  MA-323 (Servo Control) Schematic Diagram 4-17
  MA-323 (Hi-Fi Audio) Schematic Diagram 4-19
  MA-323 (IO) Schematic Diagram 4-21
  MA-323 (Tuner) Schematic Diagram 4-23
  MA-323 (Mode Control) Schematic Diagram 4-25
  MA-323 (FL Driver) Schematic Diagram 4-27
  MA-323 (Power Supply) Schematic Diagram 4-29
  DS-80 Printed wiring Board and Schematic Diagram 4-31
  NK-11 Printed wiring Board and Schematic Diagram 4-33
  DM-76, MF-312 Printed Wiring Board and Schematic Diagram 4-35
  HS-921SF/921SF1 Printed Wiring Board 4-37
  HS-921SF/921SF1 Schematic Diagram 4-39
  SR-708 Printed Wiring Board 4-41
  SR-708 Schematic Diagram 4-43

5. INTERFACE, IC PIN FUNCTION DESCRIPTION

5-1. System Control-Video Block Interface (MA-323 board IC161) 5-1
5-2. System Control-Servo Peripheral Circuit Interface (MA-323 board IC161) 5-1
5-3. System Control-Mechanism Block Interface (MA-323 board IC161) 5-2
5-4. System Control-Audio Block Interface (MA-323 board IC161) 5-3
5-5. Servo/System/Tuner/Timer Control Microprocessor Pin Function (MA-323 board IC161) 5-4
5-6. Korean Stereo Processor Pin Function (NK-11 board IC1) 5-5

6. ERROR CODES 6-1

7. ADJUSTMENTS

7-1. Mechanical Adjustments 7-1
7-2. Electrical Adjustments 7-1
2-1. Pre-Adjustment Preparations 7-1
  2-1-1. Instruments to be Used 7-1
  2-1-2. Connection 7-1
  2-1-3. Set-up of Adjustment 7-1
  2-1-4. Alignment Tape 7-1
  2-1-5. Specified I/O Level and Impedance 7-1
  2-1-6. Adjusting Sequence 7-2
2-2. Power Supply Adjustment 7-2
  2-2-1. Power Supply Check 7-2
  2-2-2. +6V Adjustment 7-2
2-3. Servo System Adjustment 7-2
  2-3-1. Switching Position Adjustment 7-2
2-4. Audio System Adjustments 7-3
  2-4-1. Hi-Fi Audio System Adjustment 7-3
    1. AF Switching Position Adjustment 7-3
    2. Frequency Response Check 7-3
    3. Overall Level Characteristic and Distortion Factor Check 7-4
    4. Overall S/N Check 7-4
  2-4-2. Normal Audio System Adjustment 7-4
    1. ACE Head Adjustment 7-4
    2. E-E Output Level Check 7-4
    3. Frequency Responce Check 7-4
    4. Overall Level Characteristic and Distortion Factor Check 7-5
    5. Overall S/N Check 7-5
2-5. Tuner System Adjustment 7-5
  2-5-1. Separation Adjustment 7-5
2-6. Parts Arrangement Diagram for Adjustments 7-6

8. REPAIR PARTS LIST

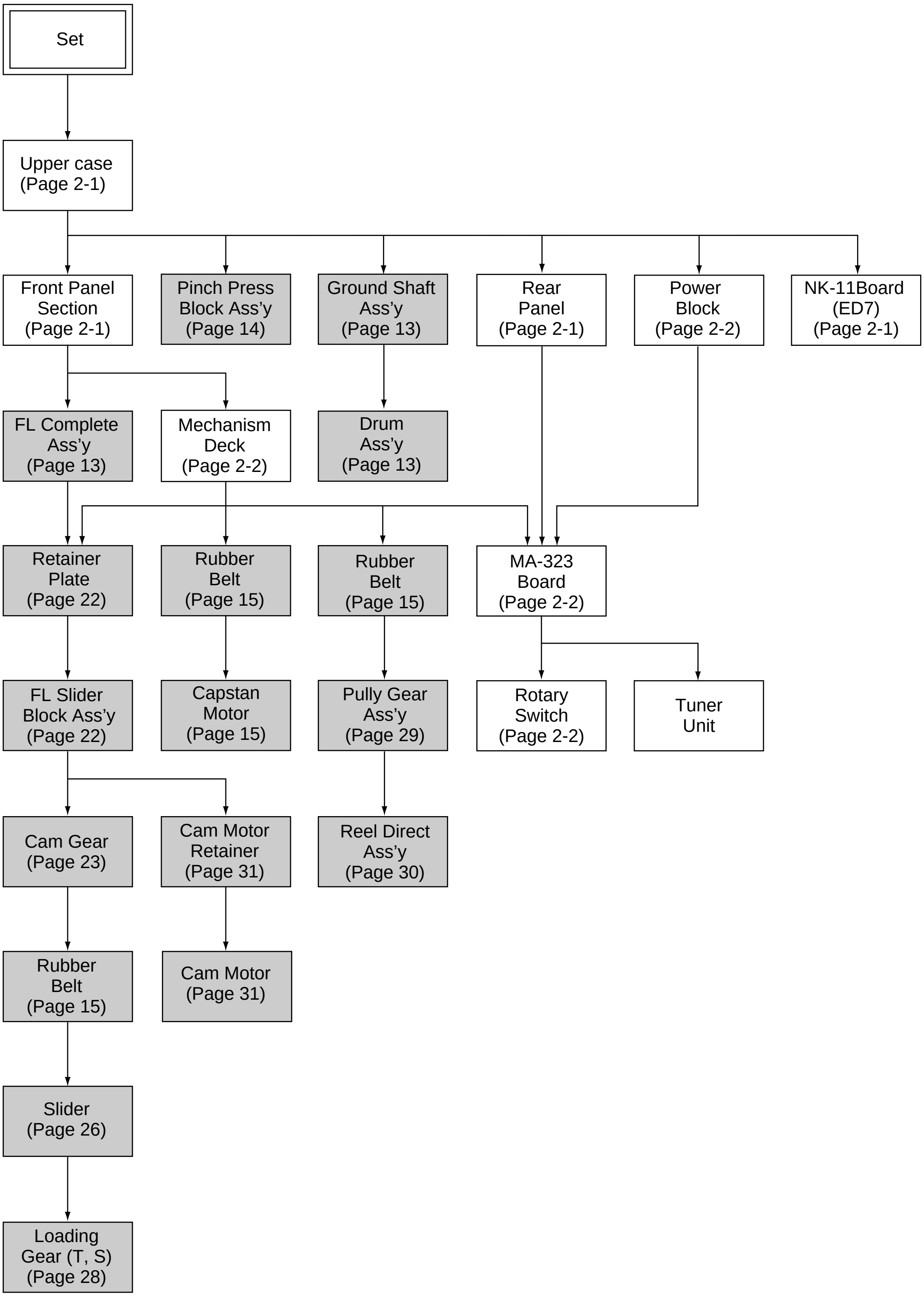
8-1. Exploded Views 8-1
  8-1-1. Front Panel and Cabinet Assemblies (ED1) 8-1
  8-1-2. Chassis Assembly (ED1) 8-2
  8-1-3. Front panel and Cabinet Assemblies (ED4/ED7/ED8) 8-3
  8-1-4. Chassis Assembly (ED4/ED7/EZ8) 8-4
  8-1-5. Mechanism Chassis Assembly (1) 8-5
  8-1-6. Mechanism Chassis Assembly (2) 8-6
  8-1-7. Mechanism Chassis Assembly (3) 8-7
8-2. Electrical Parts List 8-8

SERVICE NOTE

1. DISASSEMBLY

- This set can be disassembled in the order shown below.

Note: Pages in ☐ indicated pages in the SERVICE MANUAL.
Pages in ▨ indicated pages in the VHS MECHANICAL ADJUSTMENT MANUAL VI.


Set
Upper case (Page 2-1)
Front Panel Section (Page 2-1)
Pinch Press Block Ass'y (Page 14)
Ground Shaft Ass'y (Page 13)
Rear Panel (Page 2-1)
Power Block (Page 2-2)
NK-11Board (ED7) (Page 2-1)
FL Complete Ass'y (Page 13)
Mechanism Deck (Page 2-2)
Drum Ass'y (Page 13)
Retainer Plate (Page 22)
Rubber Belt (Page 15)
Rubber Belt (Page 15)
MA-323 Board (Page 2-2)
FL Slider Block Ass'y (Page 22)
Capstan Motor (Page 15)
Pully Gear Ass'y (Page 29)
Rotary Switch (Page 2-2)
Tuner Unit
Cam Gear (Page 23)
Cam Motor Retainer (Page 31)
Reel Direct Ass'y (Page 30)
Rubber Belt (Page 15)
Cam Motor (Page 31)
Slider (Page 26)
Loading Gear (T, S) (Page 28)

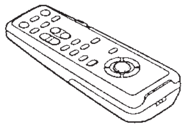
SECTION 1
GENERAL

This section is extracted from SLV-ED1PL instruction manual.

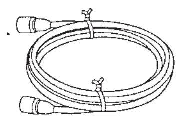
Step 1
Unpacking

Check that you have received the following items with the VCR:

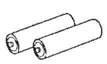
- Remote commander



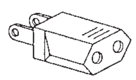
- 75-ohm coaxial cable with F-type connectors



- Size AA (R6) batteries



- Plug adaptor

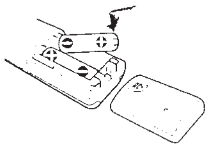


Step 2
Setting up the remote commander

Inserting the batteries

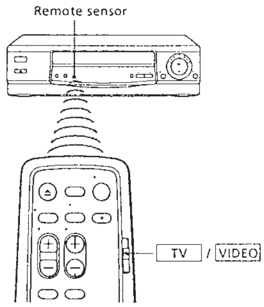
Insert two size AA (R6) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.

Insert the negative (–) end first, then push in and down until the positive (+) end clicks into positon.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. Buttons on the remote commander marked with a dot (•) can be used to operate your Sony TV. If the TV does not have the ⊠ symbol near the remote sensor, this remote commander will not operate the TV.



To operate	Set TV / VIDEO to
the VCR	VIDEO and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

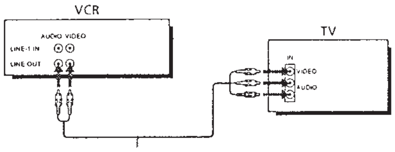
Notes
- With normal use, the batteries should last about three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

Step 3
Hookup

Audio/video (A/V) hookup

If your TV has audio/video (A/V) input jacks, you will get a better picture and sound when you hook up your VCR using these connections. If your TV doesn't have A/V inputs, see the following page for antenna hookup.

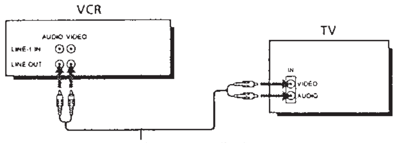
A Use this hookup if your TV has stereo jacks



Audio/video cable (not supplied)

Tip
- If you want to use the Trinitron TV Synchro Play function (see page 20), this connection is necessary. (If your TV has two or more inputs, connect the audio/video cable to the VIDEO IN 1 jacks.)

B Use this hookup if your TV doesn't have stereo jacks

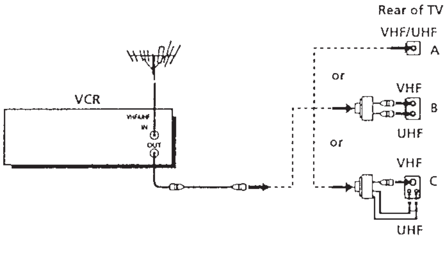


Audio/video cable (not supplied)

Antenna hookup

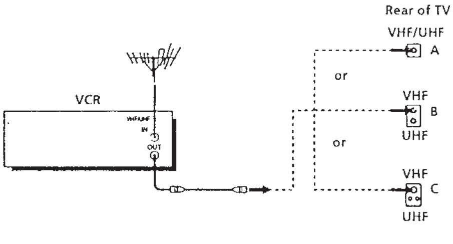
Make the following connections when you're using an antenna.

A Use this hookup if you're using:
- VHF/UHF antenna (you get channels 2–13 and channels 14 and higher)
- UHF-only antenna (you get channels 14 and higher)
- Separate VHF and UHF antennas



Match the type of connector on your TV: A, B, or C.

B Use this hookup if you're using a VHF-only antenna (you get channels 2–13 only)



Match the type of connector on your TV: A, B, or C.

For connector types B and C, no UHF connection is required.

If you cannot connect your antenna cable to the VCR directly
If your antenna cable is a flat cable (300-ohm twin lead cable), attach an external antenna connector (not supplied) so you can connect the cable to the VHF/UHF IN connector. If you have separate cables for VHF and UHF antennas, you should use a U/V band mixer (not supplied). For details, see page 37.

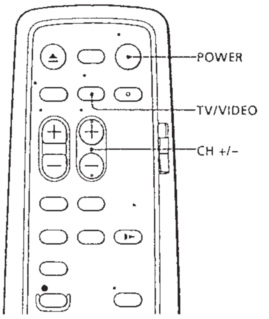
continued

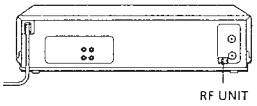
Step 3: Hookup (continued)

Setting the RF unit

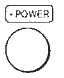
When connecting the VCR to the TV using only the antenna cable, you must set the RF UNIT switch on the rear of the VCR so that the TV can receive the correct signal from the VCR.

If you made A/V connections (page 6) you can skip this step.





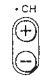
1
RF UNIT
CH3 CH4
Set the RF UNIT switch on the rear of the VCR to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel.

2 

Press POWER to turn on the VCR.

3

Press TV/VIDEO on the remote commander to turn on the VIDEO indicator in the VCR's display window.

4 

Press CH +/– to display a channel number in the display window. Select an active channel number in your area.

5 Turn on your TV and set it to the channel you selected in step 1 (channel 3 or 4).

The selected TV channel broadcast appears on the TV screen. If the channels change when you press CH +/–, you have made the correct setting.

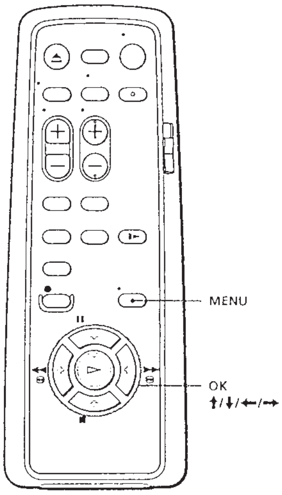
Whenever you use the VCR, set the TV to the channel selected in step 1.

Step 4
Setting the clock

Set the time and date to use the timer feature for recording programs.

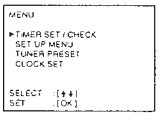
Before you start...

- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the VCR's display window.



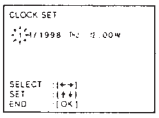
1

Press MENU.



```
MENU

▶TIMER SET / CHECK
 SET UP MENU
 TUNER PRESET
 CLOCK SET

SELECT   :[↑↓]
SET      :[OK]
```

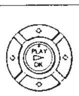
2
Press ↑/↓ to move the cursor (▶) to CLOCK SET, then press OK.

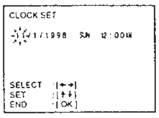


```
CLOCK SET

1/1/1998 [illegible] 12:00AM

SELECT   :[←→]
SET      :[↑↓]
END      :[OK]
```

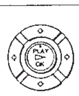
continued

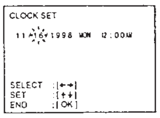
Step 4: Setting the clock (continued)

3 
Press ↑/↓ to set the month.

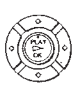


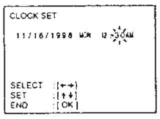
```
CLOCK SET

11/1/1998 SUN 12:00AM

SELECT   :[←→]
SET      :[↑↓]
END      :[OK]
```

4 
Press → to flash the day and press ↑/↓ to set the day.
The day of the week is set automatically.



```
CLOCK SET

11/16/1998 MON 12:00AM

SELECT   :[←→]
SET      :[↑↓]
END      :[OK]
```

5 
Set the year, hour and minutes in sequence, using → to flash the item to be set, and ↑/↓ to select the digits.



```
CLOCK SET

11/16/1998 MON 12:30AM

SELECT   :[←→]
SET      :[↑↓]
END      :[OK]
```

6
Press OK to start the clock.

Tip

- To change the digits during setting, press ← to return to the item to be changed, and select the digits using ↑/↓.

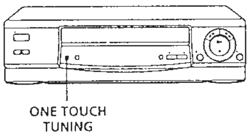
Note

- The menu disappears automatically if you don't proceed for more than a few minutes.

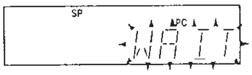
Step 5
Presetting channels

First, we recommend that you preset the receivable channels in your area using one touch tuning. You can also preset the channels automatically using the menu. Then, if some channels could not be preset automatically, set them manually; if there are any unwanted channels among the preset ones, you can disable the channels.

Presetting all receivable channels using one touch tuning



1
ONE TOUCH TUNING
Press ONE TOUCH TUNING on the VCR for more than 3 seconds.
The VCR starts the channel presetting.



The WAIT indicator goes off when all receivable channels are preset.

To check to see if the channels are preset correctly

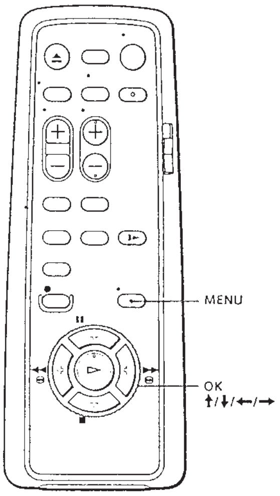
Set the TV to the video channel and press CHANNEL +/– on the VCR. If the TV screen changes to a different program each time you press CHANNEL +/–, the channels are preset correctly.

Tip

- To stop one touch tuning, press ONE TOUCH TUNING or ■ STOP on the VCR during the setting.

continued

Presetting all receivable channels automatically

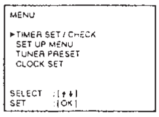


Before you start...

- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the VCR's display window.

1

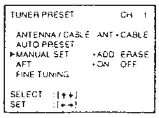
Press MENU.



```
MENU

▶TIMER SET / CHECK
 SET UP MENU
 TUNER PRESET
 CLOCK SET

SELECT   :[↑↓]
SET      :[OK]
```

2

Press ↑/↓ to move the cursor (▶) to TUNER PRESET, then press OK.



```
TUNER PRESET            CH  1

 ANTENNA / CABLE  ANT •CABLE
 AUTO PRESET
▶MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   :[↑↓]
SET      :[←→]
```

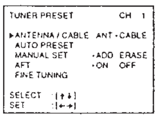
3

Press ↑/↓ to select ANTENNA/CABLE.

4

- To preset cable TV channels:

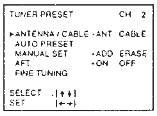
Press ←/→ to set ANTENNA/CABLE to CABLE.



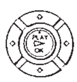
```
TUNER PRESET            CH  1

▶ANTENNA / CABLE  ANT •CABLE
 AUTO PRESET
 MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   :[↑↓]
SET      :[←→]
```

- To preset VHF and UHF channels:

Press ←/→ to set ANTENNA/CABLE to ANT.

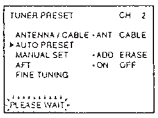


```
TUNER PRESET            CH  2

▶ANTENNA / CABLE •ANT  CABLE
 AUTO PRESET
 MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   .[↑↓]
SET       [←→]
```

5 

Press ↑/↓ to select AUTO PRESET, then press OK.

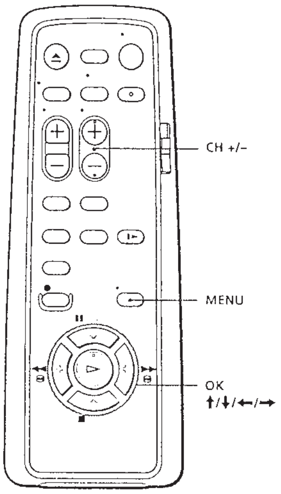
All receivable channels are preset in numerical sequence. When no more receivable channels can be found, presetting stops and the picture from the lowest numbered channel is displayed on the TV screen.

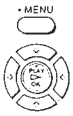


```
TUNER PRESET            CH  2

 ANTENNA / CABLE •ANT  CABLE
▶AUTO PRESET
 MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

PLEASE WAIT
```

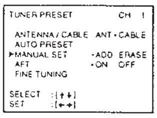
continued

Presetting/disabling channels manually

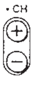


1 

Press MENU and select TUNER PRESET, then press OK.



```
TUNER PRESET            CH  1

 ANTENNA / CABLE  ANT •CABLE
 AUTO PRESET
▶MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   :[↑↓]
SET      :[←→]
```

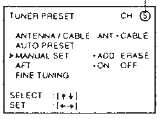
2 

- To preset a channel:

1 Press CH +/– to select the channel number.

2 Press ←/→ to set MANUAL SET to ADD.

Channel to be preset



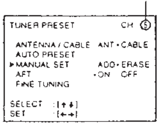
```
TUNER PRESET            CH  ⑤

 ANTENNA / CABLE  ANT •CABLE
 AUTO PRESET
▶MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   :[↑↓]
SET       [←→]
```

- To disable a channel:

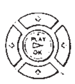
1 Press CH +/– to select the channel number.

2 Press ←/→ to set MANUAL SET to ERASE.

Channel to be disabled



```
TUNER PRESET            CH  ⑤

 ANTENNA / CABLE  ANT •CABLE
 AUTO PRESET
▶MANUAL SET         ADD •ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   :[↑↓]
SET       [←→]
```

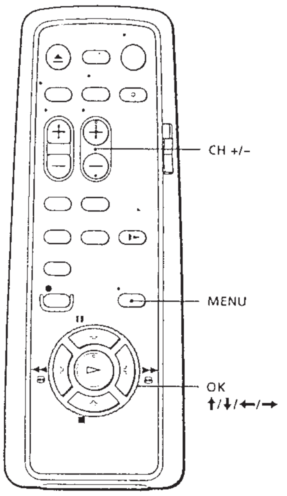
3 

Repeat step 2 to preset or disable channels as required, then press OK.

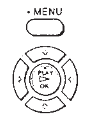
continued

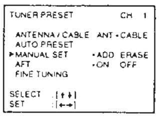
If the picture is not clear

Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture of a channel is not clear, you can also use the manual tuning function.



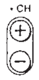
1 Press MENU and select TUNER PRESET, then press OK.



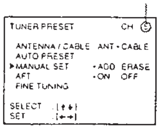


```
TUNER PRESET               CH  1

 ANTENNA / CABLE   ANT •CABLE
 AUTO PRESET
▶MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   :[↑↓]
SET      :[←→]
```

2 Press CH +/– to select the channel you want to fine-tune.

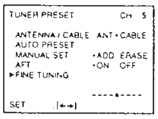


Selected channel



```
TUNER PRESET               CH  5

 ANTENNA / CABLE   ANT •CABLE
 AUTO PRESET
▶MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
 FINE TUNING

SELECT   :[↑↓]
SET      :[←→]
```

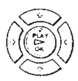
3 Press ↑/↓ to select FINE TUNING. The fine tuning meter appears.

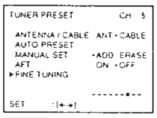


```
TUNER PRESET               CH  5

 ANTENNA / CABLE   ANT •CABLE
 AUTO PRESET
 MANUAL SET        •ADD  ERASE
 AFT               •ON   OFF
▶FINE TUNING

                   ----•----
SET      :[←→]
```

4 Press ←/→ to adjust to a clearer picture, then press OK.

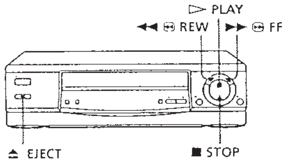
Note that the AFT setting switches to OFF.

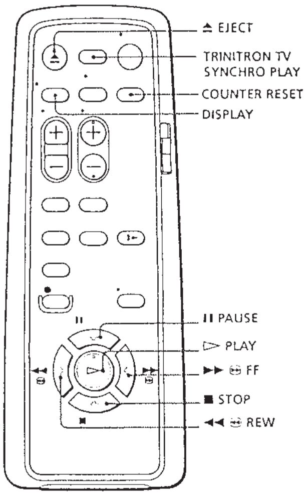




```
TUNER PRESET               CH  5

 ANTENNA / CABLE   ANT •CABLE
 AUTO PRESET
 MANUAL SET        •ADD  ERASE
 AFT                ON  •OFF
▶FINE TUNING

                   -------•--
SET      :[←→]
```

Playing a tape

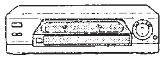




1 Turn on your TV and set it to the video channel.

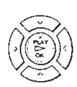
2 Insert a tape.

The VCR turns on and starts playing automatically if you insert a tape with its safety tab removed.



3 Press ▷ PLAY.

When the tape reaches the end, it will rewind automatically.

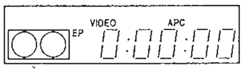


Additional tasks

To	Press
Stop play	■ STOP
Pause play	II PAUSE
Resume play after pause	II PAUSE or ▷ PLAY
Fast-forward the tape	▶▶ ⊖ FF during stop
Rewind the tape	◀◀ ⊖ REW during stop
Eject the tape	≜ EJECT

To use the time counter

At the point on the tape that you want to find later, press COUNTER RESET. The counter in the display window resets to "0:00:00." Search for the point afterwards by referring to the counter.



To display the counter on the TV screen, press DISPLAY.

Notes

- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- While setting the menu on the TV screen, you cannot use the ▷ PLAY, II PAUSE, ▶▶ ⊖ FF, ◀◀ ⊖ REW, or ■ STOP buttons.
- The counter resets to "0:00:00" whenever a tape is reinserted.
- The counter stops counting when it comes to a portion with no recording.

continued

Turning on the VCR and TV, and starting playback automatically (Trinitron TV Synchro Play)

You can only use this function if your TV is made by Sony (Trinitron TV).

How to connect to use this function

Connect the VCR and TV with the audio/video cable (see "Audio/video (A/V) hookup" on page 6.) Be sure to connect the audio/video cable to the VIDEO IN 1 jacks on the TV if the TV has two inputs or more. The TV must be placed where it will respond to the remote commander while you are pointing it at the VCR.

Operation

Make sure that the TV's power is in standby mode.

Press TRINITRON TV SYNCHRO PLAY and hold the remote commander in place for about two seconds.

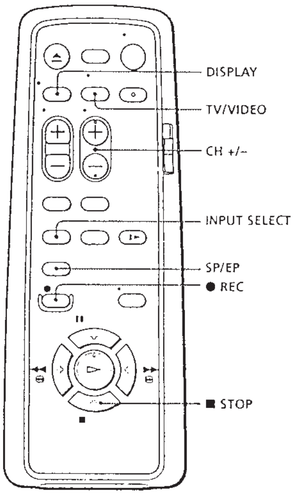
The VCR and TV turn on, and the TV is set to VCR reception. If there is a tape in the VCR, playback starts automatically.

Notes

- If the Trinitron TV Synchro Play function does not work properly:
  - – Wait a few moments, and press the button again.
  - – Replace both of the batteries with new ones, and press the button again.

  Note that this function may not operate some Sony TVs because of the remote commander's signal limitations.
- Do not press TRINITRON TV SYNCHRO PLAY while playing back a video tape. If you do so, the TV's input source will momentarily switch to the TV's tuner.

Recording TV programs

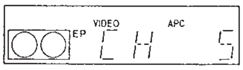


1 Turn on your TV and set it to the video channel.

2 Insert a tape with its safety tab in place.

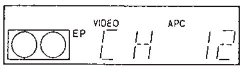
3 INPUT SELECT

Press INPUT SELECT until a channel number appears in the display window.



4 CH

Press CH +/– to select the channel you want to record.



continued

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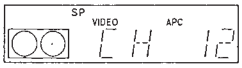
5 SP/EP

Press SP/EP to select the tape speed, SP or EP.

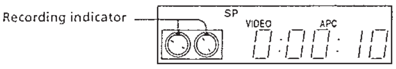
EP (Extra Play) provides recording time three times as long as SP (Standard Play), however, SP produces better picture and audio quality.



6 ● REC

Press ● REC to start recording.

The recording indicator lights up red in the display window.

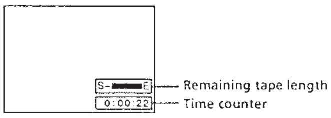


To stop recording

Press ■ STOP.

To check the remaining tape length

Press DISPLAY. The white bar indicates the approximate length of tape remaining.



To watch another TV program while recording

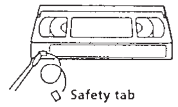
1 Press TV/VIDEO to turn off the VIDEO indicator in the display window.

2 If the TV is connected to the VCR's LINE OUT jacks, set the TV to TV input; if not, skip this step.

3 Select another channel on the TV.

To save a recording

To prevent accidental erasure, break off the safety tab as illustrated. To record on a tape again, cover the tab hole with adhesive tape.



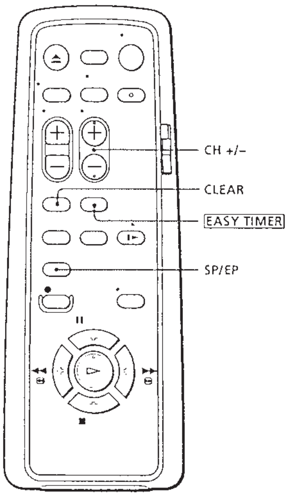
Tips

- You can select a video source from the LINE-1 IN jacks using INPUT SELECT or CH +/– buttons.
- The display appears on the TV screen indicating information about the tape, but the information won't be recorded on the tape.
- If you don't want to watch TV while recording, you can turn off the TV.

Notes

- The display doesn't appear during still (pause) mode or slow-motion playback.
- It may take up to one minute for the VCR to calculate and display the remaining tape length after you press DISPLAY.
- The VCR marks the tape with an index signal at the point where each recording begins. You can use these index search signals as references to find a specific recording with other Sony VCRs that feature the index search function.

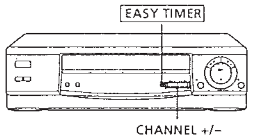
Recording TV programs using the easy timer



You can record one program on the same day (within 24 hours) using the easy timer. If the VCR clock has not been set due to power interruption, etc., you can set the clock and timer recording.

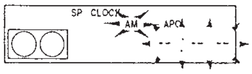
Before you start...

- Insert a tape with its safety tab in place. Make sure the tape is longer than the recording time.
- If you want to see the setting on the TV screen, turn on the TV and set it to the video channel.



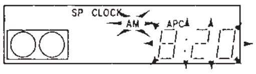
1 Press EASY TIMER.

The CLOCK indicator appears and the current time flashes in the display window. If the clock has not been set yet or has been cleared, "-:-- --" flashes.



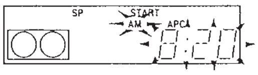
2 Set the current time, if necessary, using CH +/–. If the clock has already been set correctly, skip this step.

Press CH +/– to increase or decrease the time by a minute. Holding down CH +/– changes the time by 15 minutes.



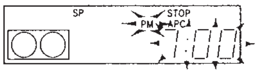
3 Press EASY TIMER to confirm the clock setting.

The START indicator appears.



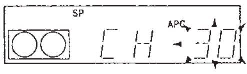
4 Set the recording start time using CH +/– in the same way as in step 2, then press EASY TIMER.

The STOP indicator appears.



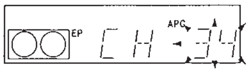
5 Set the recording stop time in the same way as in step 2, then press EASY TIMER.

A channel number flashes.



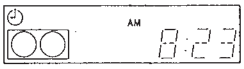
6 Press CH +/– to select the channel you want to record.

To select the tape speed, press SP/EP.



7 Press EASY TIMER to confirm the setting.

The ⏲ indicator appears in the display window and the VCR stands by for recording.



continued

To stop recording

To stop the VCR while recording, press ■ STOP.

To check or change the timer setting

Press EASY TIMER repeatedly until the setting you want to check or change flashes. Then re-enter the new setting, if necessary. You can also change the timer setting using the TIMER SET/CHECK menu. For details, see page 31.

To use the VCR after setting the timer

To use the VCR before a timer recording begins, just press POWER. The ⏲ indicator turns off and the VCR switches on. Remember to press POWER to reset the VCR in timer recording standby after using the VCR.

You can also do the following tasks while the VCR is recording:

- Reset the counter.
- Display tape information on the TV screen.
- Check the timer settings.
- Watch another TV program.

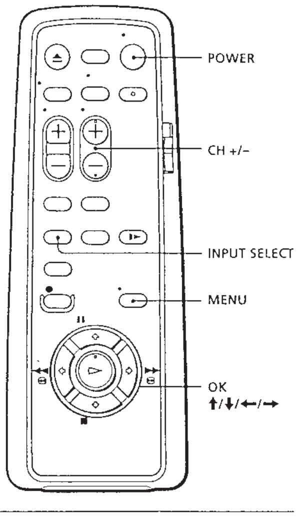
Tips

- To record from a source connected to LINE-1 IN jacks, press INPUT SELECT or CH +/– to display "L" in the display window.
- To cancel the easy timer setting, press CLEAR on the remote commander or press CHANNEL + and – on the VCR at the same time during the setting. Note that the cancellation can only be done after clock setting mode.

Notes

- You cannot set the easy timer if eight programs have already been set.
- You can set the timer for only one program using the easy timer. If you want to set the timer for other programs, use the TIMER SET/CHECK menu. For details, see page 27.
- You cannot set the date using the easy timer. Set the date using the CLOCK SET menu if you want to set the timer with the TIMER SET/CHECK menu. For details, see page 9.
- The ⏲ indicator flashes in the display window when you set the timer with no tape inserted.

Setting the timer manually

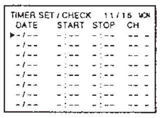


You can preset up to eight programs at a time.

Before you start...

- Check that the VCR clock is set to the correct time.
- Turn on your TV and set it to the video channel.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.

1 Press MENU and select TIMER SET/CHECK, then press OK.



```
TIMER SET / CHECK   11 / 16 MON
 DATE    START  STOP   CH
▶-/--    -:--   -:--   -- -
 -/--    -:--   -:--   -- -
 -/--    -:--   -:--   -- -
 -/--    -:--   -:--   -- -
 -/--    -:--   -:--   -- -
 -/--    -:--   -:--   -- -
 -/--    -:--   -:--   -- -
 -/--    -:--   -:--   -- -
```

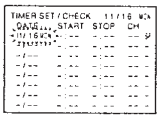
continued

Setting the timer manually (continued)

2

Set the date, start and stop times, channel number and tape speed:

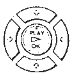
1 Press ➡ to flash each item in turn.
2 Press ⬆/⬇ to set each item.
To correct a setting, press ⬅ to return to that setting and reset.



```
TIMER SET / CHECK     11/16 MON
 DATE       START   STOP    CH
```

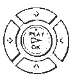
To record the same program every day or the same day every week, press ⬇ while the date is flashing. For details, see "Daily/weekly recording" on this page.

To record from a source connected to the LINE-1 IN jacks, press INPUT SELECT or CH +/– to display "L" in the "CH" position.

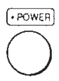
3 

Press ➡ to confirm the setting.

The cursor (▶) appears at the beginning of the line. To enter another setting, move the cursor to the next line and repeat step 2.

4 

Press OK.

5 

Press POWER to turn off the VCR.

The ◷ indicator lights up in the display window and the VCR stands by for recording.

Daily/weekly recording

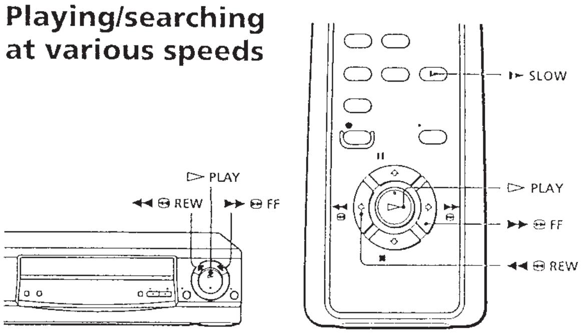
In step 2 above, press ⬇ to select the recording pattern. Each time you press ⬇, the indication changes as shown below. Press ⬆ to change the indication in reverse order.

the current date → SUN-SAT → MON-SAT → MON-FRI → EVERY SAT →
..... → EVERY MON → EVERY SUN → 1 month later → (dates count down)
→ the current date

Tips
- To set the channel, you can also use CH +/–.
- To set the tape speed, you can also use SP/EP.

Notes
- The ◷ indicator flashes in the display window when you set the timer with no tape inserted.

Playing/searching at various speeds



Playback options	Operation
View the picture during fast-forward or rewind	During fast-forward, hold ▶▶ ⊖ FF down. During rewind, hold ◀◀ ⊖ REW down.
Play at high speed	• During playback, press ▶▶ ⊖ FF or ◀◀ ⊖ REW on the remote commander. • During playback, hold ▶▶ ⊖ FF or ◀◀ ⊖ REW down. When you release the button, normal playback resumes.
Play in slow motion	During playback or pause, press I▸ SLOW.
Play frame by frame	During pause, press ▶▶ ⊖ FF or ◀◀ ⊖ REW. Hold the button down to play one frame each second.
Rewind and start play	During stop, press ⊳ PLAY on the VCR while holding ◀◀ ⊖ REW down on the VCR.

To resume normal playback

Press ⊳ PLAY.

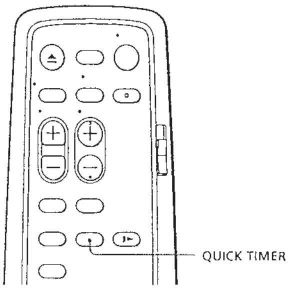
Tip
- Adjust the picture using the TRACKING +/– buttons on the VCR if:
  - The picture shakes while pausing.

  To set tracking to the center position, press both buttons (+/–) at the same time.

Notes
- The sound is muted during these operations.
- In EP mode, noise may appear or there may be no color.
- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- The picture may have snow when playing at high speed in reverse.
- On screen symbols may shake while playing or searching at various speeds.

Recording TV programs using the quick timer

After starting recording in the normal way, you can have the VCR stop recording automatically after a specified duration.



1 While recording, press QUICK TIMER once.

The ◷ indicator appears in the display window.

VIDEO
EP
APC
0:30

2 Press QUICK TIMER repeatedly to set the duration.

Each press advances the time in increments of 30 minutes.

→ 0:00 → 0:30 → 1:00 - - - - → 10:30 → 11:00 ↩

The duration decreases minute by minute to 0:00, then the VCR stops recording and turns off automatically.

To extend the duration

Press QUICK TIMER repeatedly to set to the new duration.

To stop the VCR while recording

Press ■ STOP.

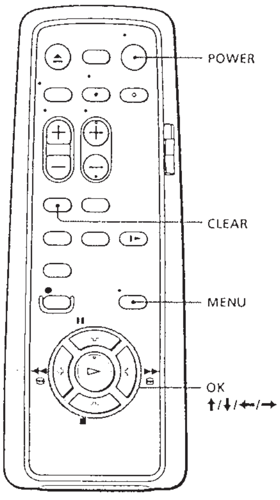
Using the quick timer during stop mode

You can set the quick timer and start recording during stop mode by pressing QUICK TIMER. To set the channel, you can use the CH +/– or INPUT SELECT buttons. Press QUICK TIMER repeatedly to set the recording duration. The recording will start automatically.

Checking/ changing/ canceling timer settings

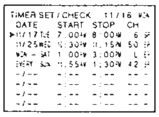
Before you start...

- Turn on your TV and set it to the video channel.



1 Press POWER to turn on the VCR.

2 Press MENU and select TIMER SET/CHECK:
- If you want to change a setting, go on to the next step.
- If you do not need to change the settings, press OK, then turn off the VCR to return to recording standby.



```
TIMER SET / CHECK     11/16 MON
 DATE       START    STOP     CH
▶11/17 TUE   7:00PM   8:00PM    6 SP
 11/25 WED   9:30PM  11:15PM   50 SP
 MON - SAT   1:00PM   3:00PM    L SP
 EVERY SUN  11:55AM   1:30PM   42 SP
```

3 Press ⬆/⬇ to select the setting you want to change or cancel:
- To change the setting, press ⬅/➡ to flash the item you want to change, and press ⬆/⬇ to reset it. Then, press ➡ repeatedly until the cursor (▶) appears at the beginning of the line.
- To cancel the setting, press CLEAR.

4 Press OK.

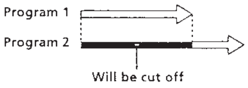
If any timer settings remain, turn off the VCR to return to recording standby.

continued

Checking/changing/canceling timer settings (continued)

When the timer settings overlap

The program that starts first has priority and the second program starts recording only after the first program has finished. If the programs start at the same time, the program listed first in the menu has priority.

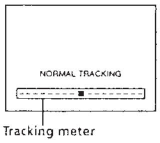


Adjusting the picture

Adjusting the tracking

Although the VCR automatically adjusts the tracking when playing a tape (the ⊠ indicator flashes in the display window, then goes off), distortion may occur if the tape was recorded in poor condition. In this case, manually adjust the tracking.

Press the TRACKING +/– buttons on the VCR to display the tracking meter. The distortion should disappear as you press one of the two buttons (the ⊠ indicator lights up). To resume automatic tracking adjustment, eject the tape and reinsert it.



About Adaptive Picture Control (APC)

Adaptive Picture Control (APC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you set APC to ON in the SET UP MENU (with the APC indicator in the display window lit).

APC playback

The APC function automatically works on all types of tapes, including rental tapes and tapes that were not recorded with APC.

APC recording

Whenever you insert a tape and start recording at the first time, the VCR adjusts to the tape using the APC function (the APC indicator flashes rapidly). This adjustment is retained until the tape is ejected.

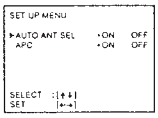
To deactivate the APC

Press MENU and select SET UP MENU, then set APC to OFF. The APC indicator in the display window goes off.

Notes
- The auto tracking adjustment cannot be guaranteed to work with tapes recorded in the LP mode on other VCRs.
- There is a delay of a few seconds before the VCR actually starts recording while the VCR analyzes the tape. To avoid the delay, first set the VCR to recording pause (the APC indicator flashes slowly) and press ● REC to have the VCR analyze the tape. After the APC indicator stops flashing, press ❙❙ PAUSE to start recording immediately. If you press ❙❙ PAUSE before the APC indicator stops flashing, the APC function is canceled.

Changing menu options

1 Press MENU and select SET UP MENU.



```
SET UP MENU

▶AUTO ANT SEL      •ON    OFF
 APC               •ON    OFF

SELECT   :[↑↓]
SET       [←→]
```

2 Press ↑/↓ to select the option to change, then press ←/→ to change the setting.

3 Press OK to return to the original screen.

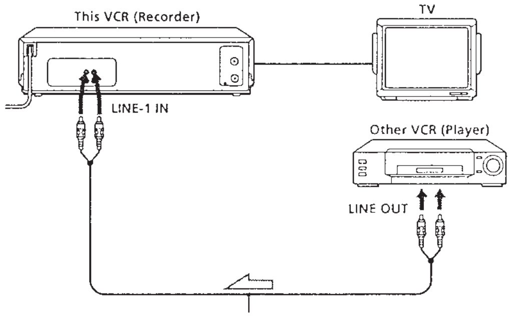
Menu choices

Initial settings are indicated in bold print.

Menu option	Set this option to
AUTO ANT SEL	**ON** if your TV is connected only to VHF/UHF OUT on the VCR. To play a tape, set the TV to the VCR channel (channel 3 or 4). OFF if your TV is connected to both VHF/UHF OUT and LINE OUT on the VCR. To play a tape, set the TV to the VCR input.
APC	**ON** to switch on the APC (Adaptive Picture Control) function and improve picture quality. OFF to switch off APC.

Editing with another VCR

How to hook up to record on this VCR



VMC-710M/720M audio/video cable (not supplied)

⇨ : Signal flow

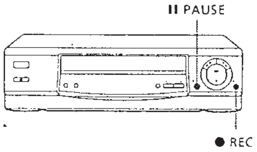
Notes
- Make sure you connect the plugs to jacks of the same color.
- If you connected this VCR to both the LINE IN and LINE OUT jacks of the other VCR, select the input correctly to prevent a humming noise.

continued

Operation
(when recording on this VCR)

Before you start editing

- Turn on your TV and set it to the video channel.
- Press INPUT SELECT or CH +/– to display "L" in the display window.
- Press SP/EP to select the tape speed, SP or EP.



1 Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.
2 Insert a tape with its safety tab in place into this (recording) VCR. Search for the point to start recording and press II PAUSE.
3 Press ● REC and set it to recording pause.
4 To start editing, press the II PAUSE buttons on both VCRs at the same time.

To stop editing

Press the ■ STOP buttons on both VCRs.

Tips

- To edit more precisely, press the II PAUSE buttons on the VCRs to release pause.
- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When it ends, press II PAUSE again to resume recording.

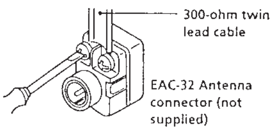
Note

- If you start recording following the procedure above, the VCR won't start recording with the APC function. To record a tape with the APC function, press ● REC again during recording pause in step 3 so that the VCR analyzes the tape. Then when you start recording in step 4, press II PAUSE immediately after the APC indicator stops flashing. If you press II PAUSE before the APC indicator stops flashing, the APC function is canceled.

General setup information

Attaching the external antenna connector

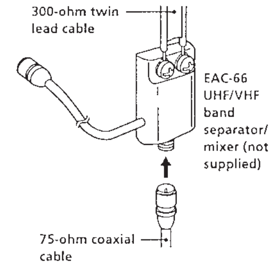
When using a 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-32 antenna connector (not supplied) to connect the antenna to the VCR.



1 Loosen the screws on the antenna connector.
2 Wind the twin leads around the screws on the antenna connector.
3 Retighten the screws.

Attaching a UHF/VHF band mixer

When using both 75-ohm coaxial cable and 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-66 UHF/VHF band separator/mixer (not supplied) to connect the antenna to the VCR.

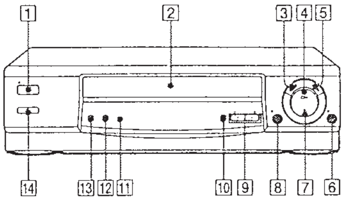


1 Loosen the screws on the mixer.
2 Wind the twin leads around the screws on the mixer.
3 Retighten the screws.
4 Connect the 75-ohm coaxial cable to the mixer.

Index to parts and controls

Refer to the pages indicated in parentheses ( ) for details.

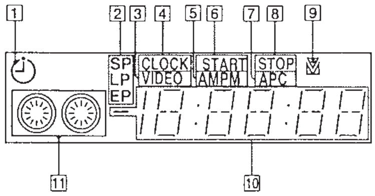
Front panel



1 POWER switch/indicator (28)
2 Tape compartment
3 ◀◀ ⊜ REW (rewind) button (19, 29)
4 ▷ PLAY button (19)
5 ▶▶ ⊜ FF (fast-forward) button (19, 29)
6 ● REC (record) button (22)
7 ■ STOP button (19)
8 II PAUSE button (19)
9 CHANNEL/TRACKING +/– buttons (21, 33)
10 EASY TIMER button (24)
11 Remote sensor (5)
12 INPUT SELECT button (21, 28)
13 ONE TOUCH TUNING button (11)
14 ≜ EJECT button (19)

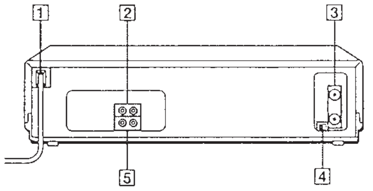
continued

Display window



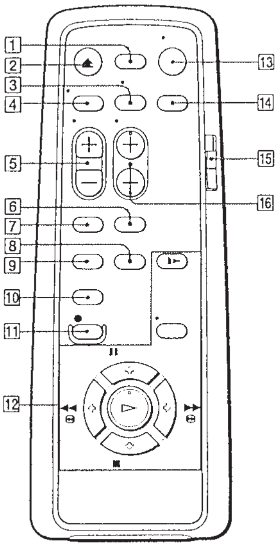
1 Timer indicator (25)
2 Tape speed indicator (22)
3 VIDEO indicator (8, 22)
4 CLOCK indicator (24)
5 AM/PM indicator
6 START indicator (25)
7 APC (Adaptive Picture Control) indicator (33)
8 STOP indicator (25)
9 Tracking indicator (33)
10 Time counter/clock/line/channel indicator (19, 21, 25, 36)
11 Tape/recording indicator (22)

Rear panel



1 AC power cord
2 LINE-1 IN AUDIO/VIDEO jacks (35)
3 VHF/UHF IN/OUT connectors (7)
4 RF (Radio Frequency) UNIT switch (8)
5 LINE OUT AUDIO/VIDEO jacks (6)

Remote commander



1 TRINITRON TV SYNCHRO PLAY button (20)

2 ≜ EJECT button (19)

3 TV/VIDEO button (8)

4 Display button (22)

5 VOL (volume) +/– buttons *(for TV)*

6 EASY TIMER button (24)

7 CLEAR button (31)

8 QUICK TIMER button (30)

9 INPUT SELECT button (21, 28)

10 SP (Standard Play)/EP (Extra Play) button (22)

11 ● REC (record) button (22)

12 Tape/menu operation buttons

MENU button (9, 34)
❚❚ PAUSE/⬆ button (19)
■ STOP/⬇ button (19)
◀◀ ⊖ REW (rewind)/⬅ button (19, 29)
▶▶ ⊖ FF (fast-forward)/ ➡ button (19, 29)
▷ PLAY/OK button (18)
❚▸ SLOW button (29)

13 POWER switch (28)

14 COUNTER RESET button (19)

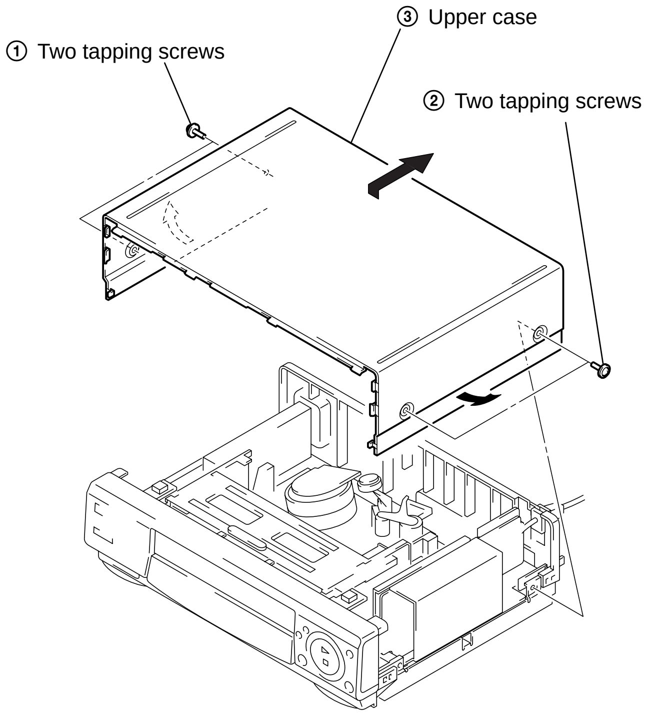
15 TV / VIDEO remote control switch (5)

16 CH (channel) +/– buttons (21)

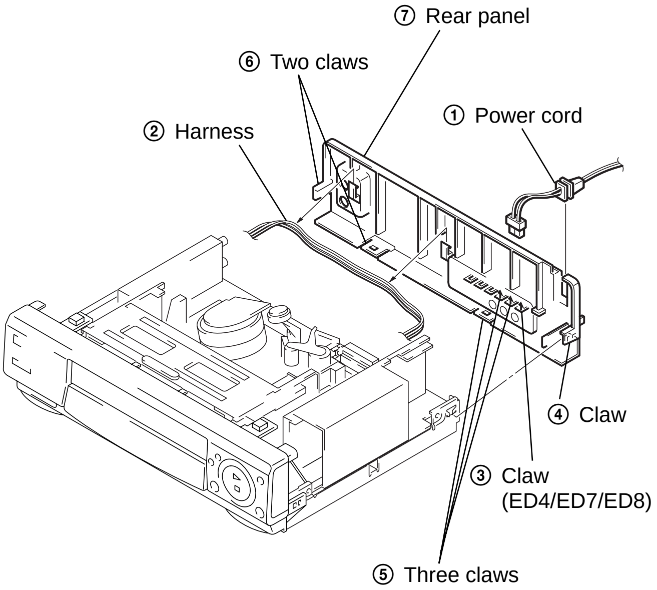
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

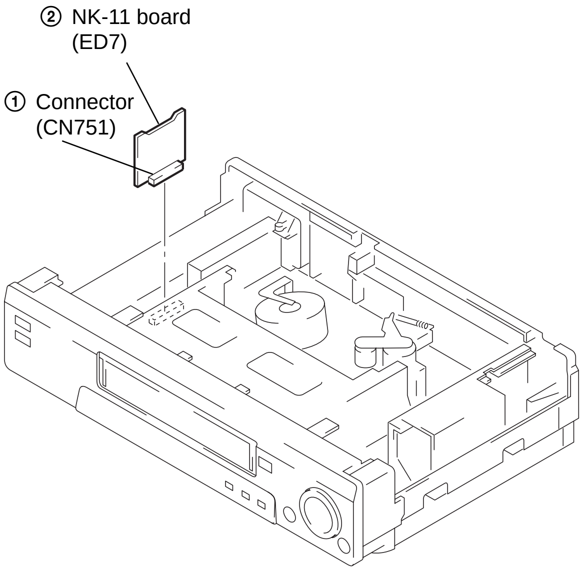
2-1. UPPER CASE REMOVAL


③ Upper case
① Two tapping screws
② Two tapping screws

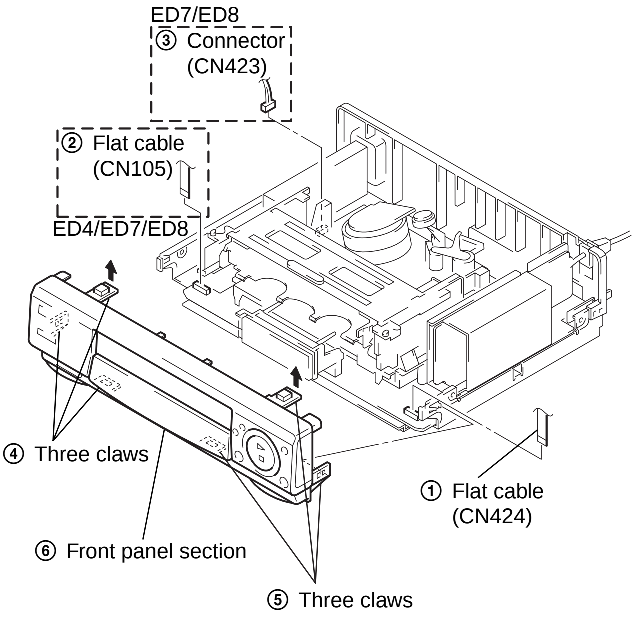
2-3. REAR PANEL REMOVAL


⑦ Rear panel
⑥ Two claws
① Power cord
② Harness
④ Claw
③ Claw
(ED4/ED7/ED8)
⑤ Three claws

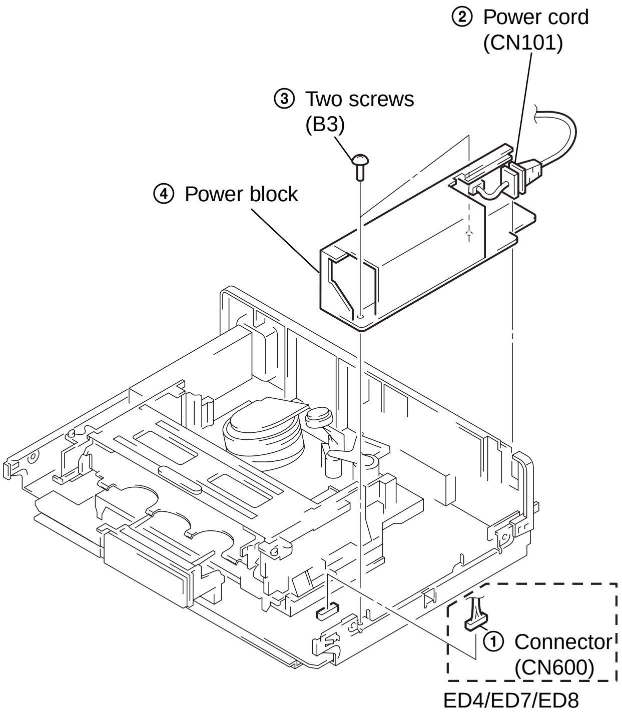
2-2. NK-11 BOARD REMOVAL


② NK-11 board
(ED7)
① Connector
(CN751)

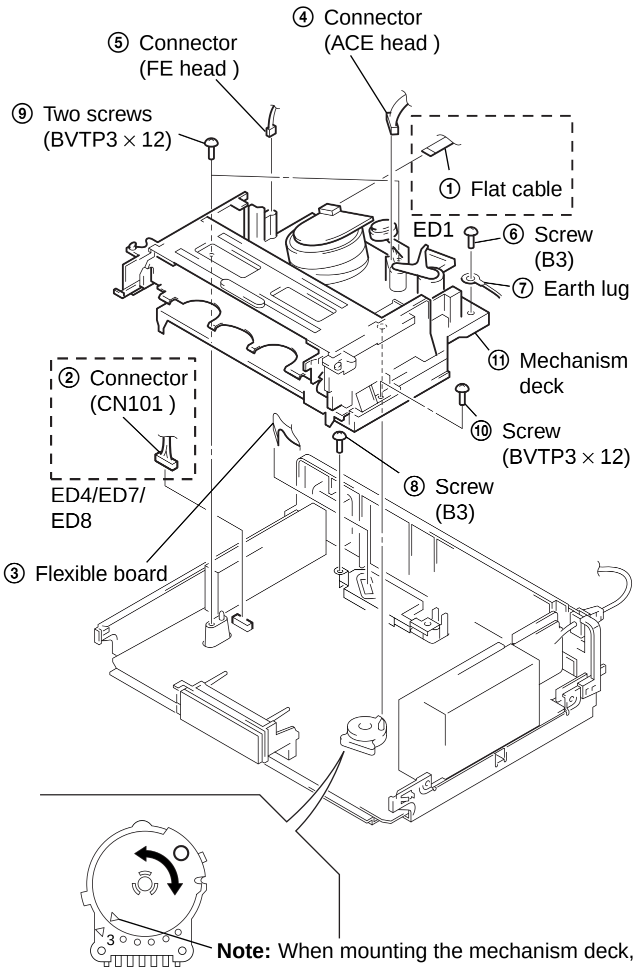
2-4. FRONT PANEL SECTION REMOVAL


ED7/ED8
③ Connector
(CN423)
② Flat cable
(CN105)
ED4/ED7/ED8
④ Three claws
① Flat cable
(CN424)
⑥ Front panel section
⑤ Three claws

2-5. POWER BLOCK REMOVAL

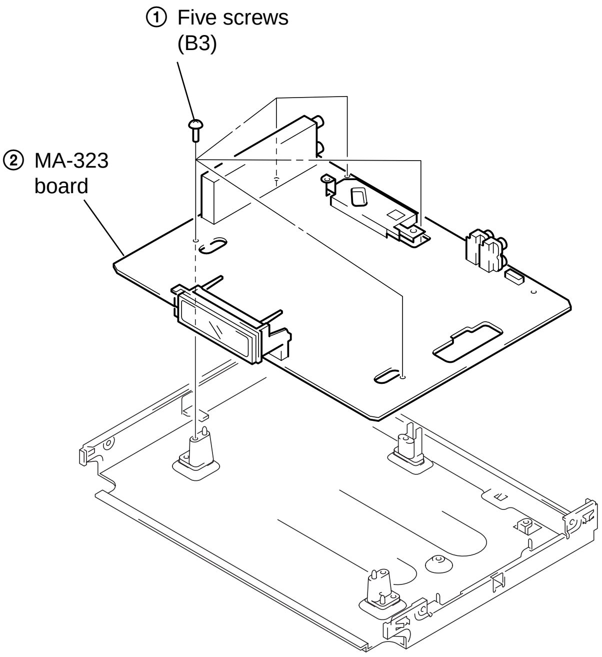

② Power cord (CN101)
③ Two screws (B3)
④ Power block
① Connector (CN600)
ED4/ED7/ED8

2-6. MECHANISM DECK REMOVAL

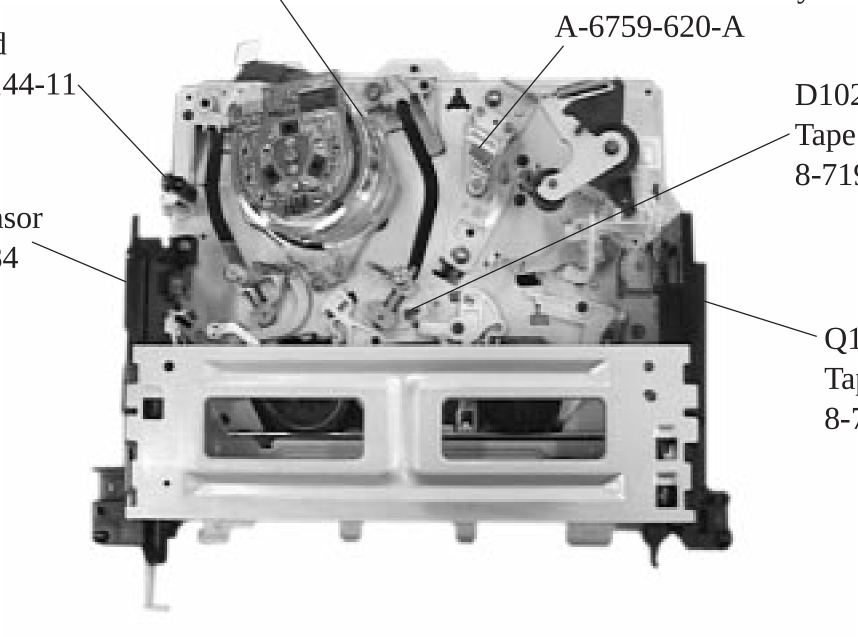

④ Connector (ACE head)
⑤ Connector (FE head)
⑨ Two screws (BVTP3 × 12)
① Flat cable
ED1
⑥ Screw (B3)
⑦ Earth lug
⑪ Mechanism deck
② Connector (CN101)
ED4/ED7/ ED8
⑩ Screw (BVTP3 × 12)
⑧ Screw (B3)
③ Flexible board
3

Note: When mounting the mechanism deck, first align △ mark on the rotary switch.

2-7. MA-323 BOARD REMOVAL


① Five screws (B3)
② MA-323 board

2-8. INTERNAL VIEWS



Drum assembly (M901) (DZH-71D-R)
1-759-455-11 (ED1)
Drum assembly (M901) (DZH-73D/Z-RP)
8-839-036-04 (ED4)
Drum assembly (M901) (DZH-94A/ZRP-R)
8-839-044-02 (ED7/ED8)

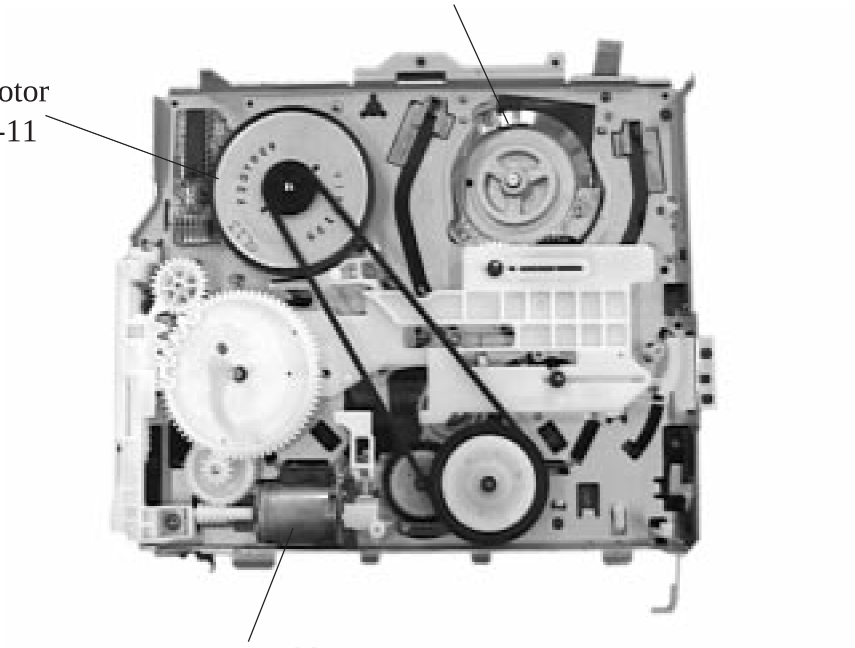
ACE head assembly
A-6759-620-A

FE head
1-500-144-11

D102
Tape top/end LED
8-719-048-26

Q100
Tape top sensor
8-729-043-84

Q101
Tape end sensor
8-729-043-84



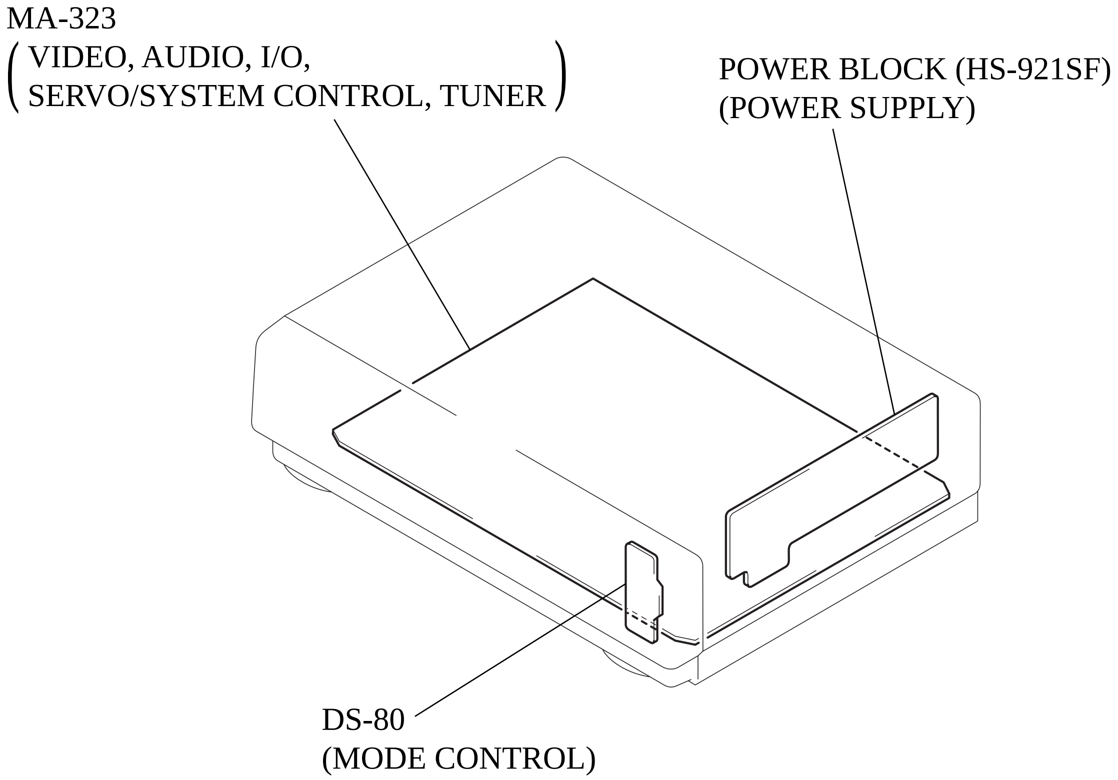
Drum assembly (M901) (DZH-71D-R)
1-759-455-11 (ED1)
Drum assembly (M901) (DZH-73D/Z-RP)
8-839-036-04 (ED4)
Drum assembly (M901) (DZH-94A/ZRP-R)
8-839-044-02 (ED7/ED8)

Capstan motor
1-698-971-11

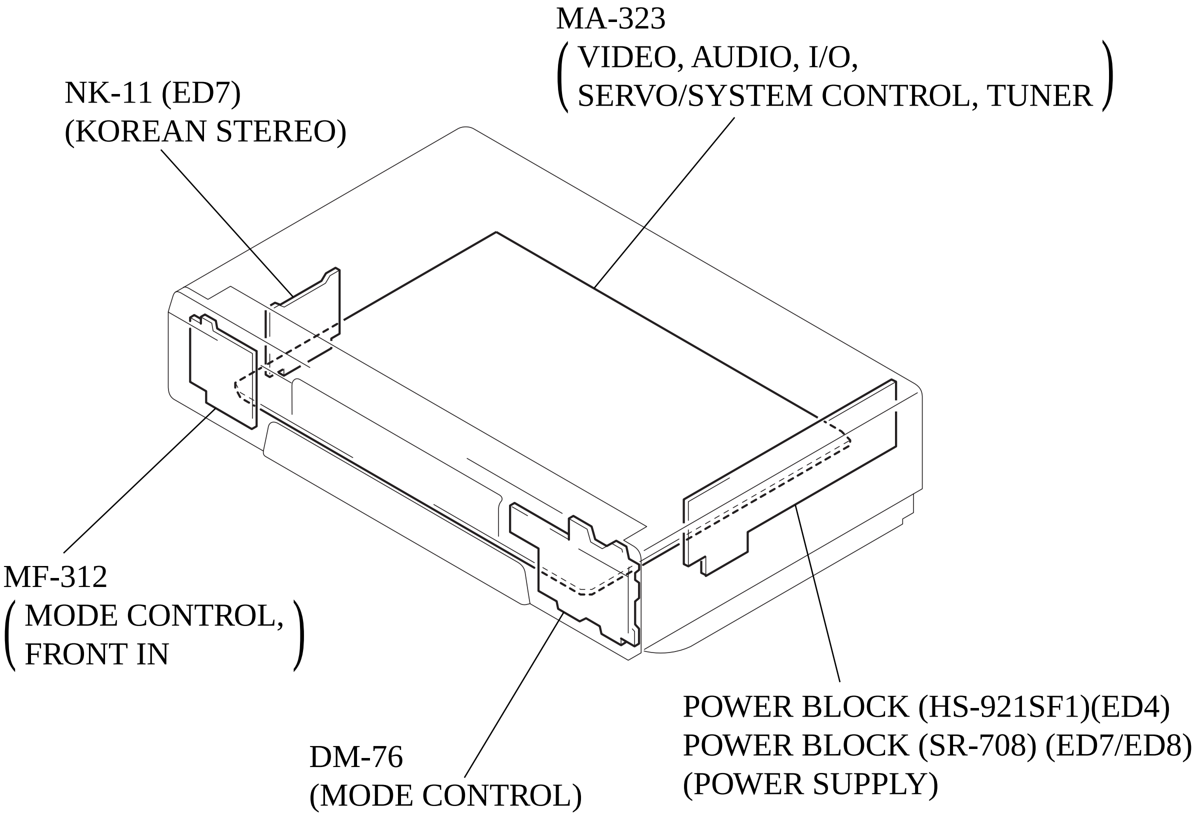
Cam motor assembly
X-3947-577-1

2-9. CIRCUIT BOARDS LOCATION

ED1

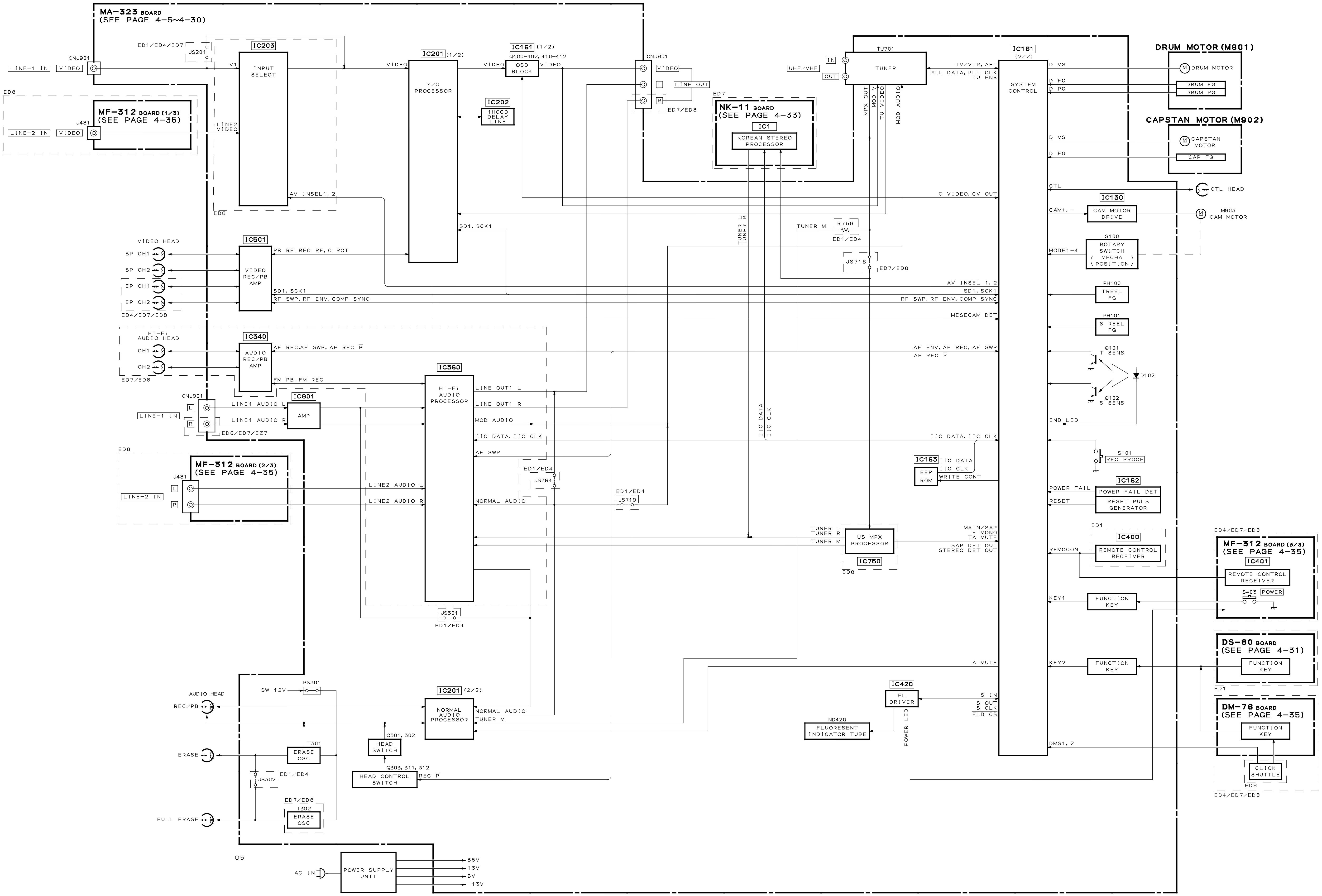

MA-323
(VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER)
POWER BLOCK (HS-921SF)
(POWER SUPPLY)
DS-80
(MODE CONTROL)

ED4/ED7/ED8

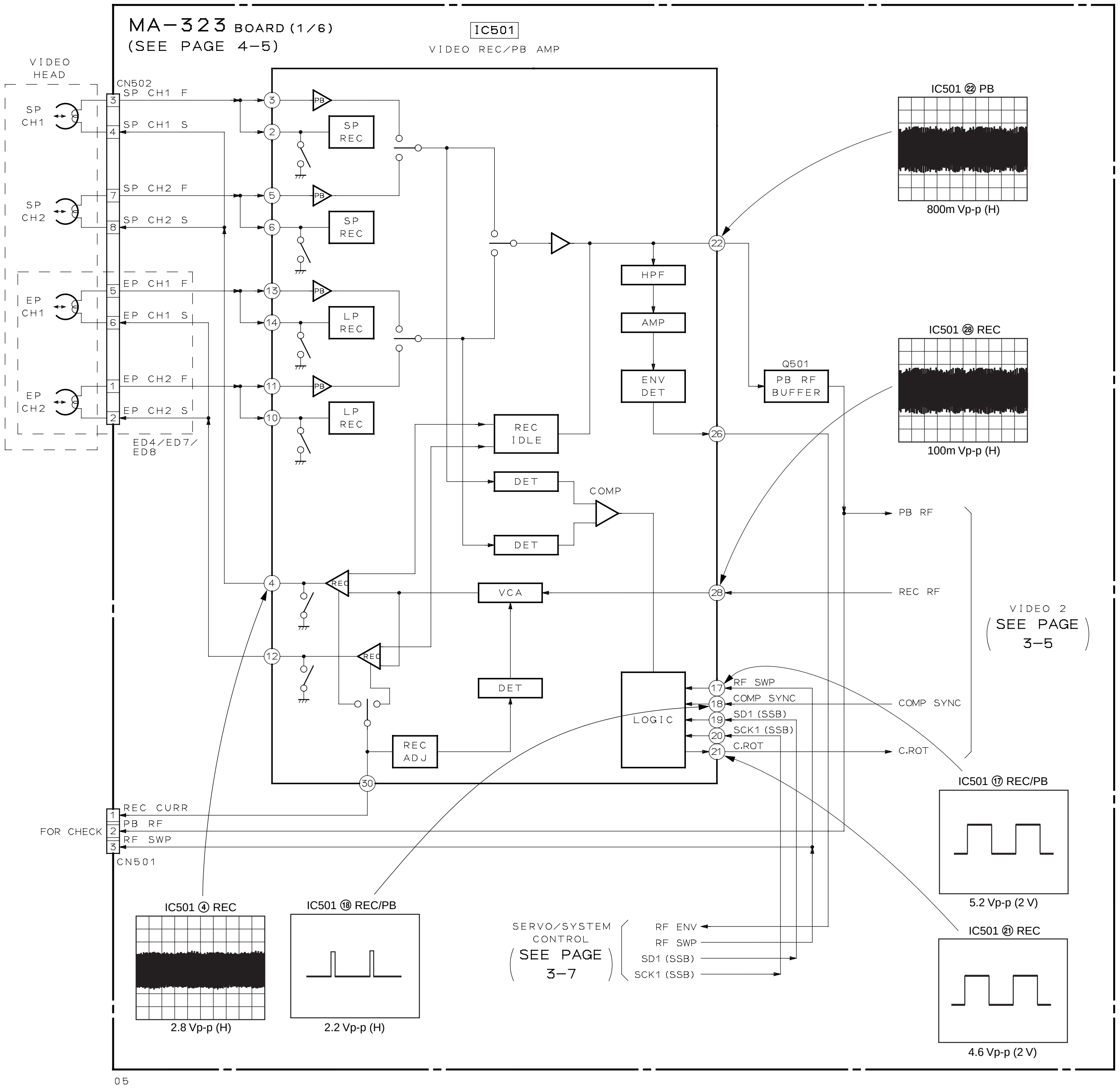

MA-323
(VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER)
NK-11 (ED7)
(KOREAN STEREO)
MF-312
(MODE CONTROL,
FRONT IN)
DM-76
(MODE CONTROL)
POWER BLOCK (HS-921SF1)(ED4)
POWER BLOCK (SR-708) (ED7/ED8)
(POWER SUPPLY)

SECTION 3
BLOCK DIAGRAM

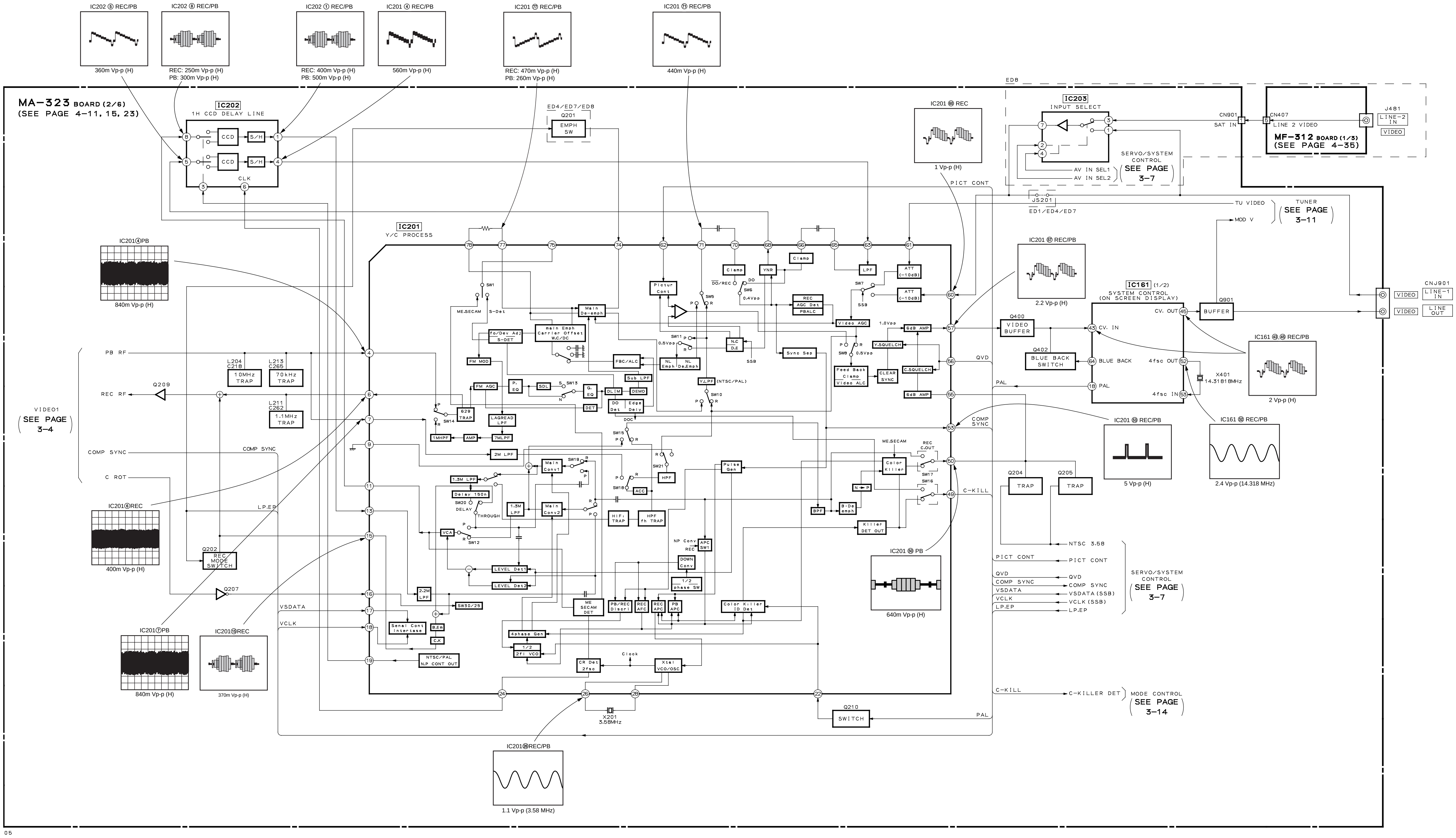
3-1. OVERALL BLOCK DIAGRAM


MA-323 BOARD
(SEE PAGE 4-5~4-30)
ED1/ED4/ED7
JS201
IC203
INPUT SELECT
CNJ901
LINE-1 IN
VIDEO
V1
ED8
MF-312 BOARD (1/3)
(SEE PAGE 4-35)
J481
LINE-2 IN
LINE2 VIDEO
AV INSEL1, 2
IC201 (1/2)
Y/C PROCESSOR
IC161 (1/2)
Q400-402, 410-412
OSD BLOCK
IC202
1HCCD DELAY LINE
SD1, SCK1
LINE OUT
ED7/ED8
ED7
NK-11 BOARD
(SEE PAGE 4-33)
IC1
KOREAN STEREO PROCESSOR
UHF/VHF
IN
OUT
TU701
TUNER
MPX OUT
MOD V
TU VIDEO
MOD AUDIO
TV/VTR, AFT
PLL DATA, PLL CLK
TU ENB
IC161 (2/2)
SYSTEM CONTROL
DRUM MOTOR (M901)
D VS
D FG
D PG
DRUM MOTOR
DRUM FG
DRUM PG
CAPSTAN MOTOR (M902)
CAPSTAN MOTOR
CAP FG
CTL
CTL HEAD
C VIDEO, CV OUT
IC130
CAM+, −
CAM MOTOR DRIVE
M903
CAM MOTOR
S100
ROTARY SWITCH (MECHA POSITION)
MODE1-4
TUNER L
TUNER R
TUNER M
R758
ED1/ED4
JS716
ED7/ED8
AV INSEL 1, 2
SD1, SCK1
RF SWP, RF ENV, COMP SYNC
PH100
TREEL FG
PH101
S REEL FG
MESECAM DET
VIDEO HEAD
SP CH1
SP CH2
EP CH1
EP CH2
ED4/ED7/ED8
IC501
VIDEO REC/PB AMP
PB RF, REC RF, C ROT
HI-FI AUDIO HEAD
CH1
CH2
ED7/ED8
IC340
AUDIO REC/PB AMP
AF REC, AF SWP, AF REC P
FM PB, FM REC
AF ENV, AF REC, AF SWP
AF REC P
Q101
T SENS
D102
Q102
S SENS
END LED
IC360
HI-FI AUDIO PROCESSOR
LINE OUT1 L
LINE OUT1 R
MOD AUDIO
IIC DATA, IIC CLK
AF SWP
LINE1 AUDIO L
LINE1 AUDIO R
IC901
AMP
ED6/ED7/EZ7
IIC DATA
IIC CLK
S101
REC PROOF
IC163
EEP ROM
WRITE CONT
ED8
MF-312 BOARD (2/3)
(SEE PAGE 4-35)
LINE2 AUDIO L
LINE2 AUDIO R
NORMAL AUDIO
ED1/ED4
JS364
ED1/ED4
JS719
POWER FAIL
RESET
IC162
POWER FAIL DET
RESET PULS GENERATOR
IC750
US MPX PROCESSOR
MAIN/SAP
F MONO
TA MUTE
SAP DET OUT
STEREO DET OUT
ED1
IC400
REMOTE CONTROL RECEIVER
REMOCON
ED4/ED7/ED8
MF-312 BOARD (3/3)
(SEE PAGE 4-35)
IC401
REMOTE CONTROL RECEIVER
S403
POWER
KEY1
FUNCTION KEY
JS301
ED1/ED4
A MUTE
KEY2
DS-80 BOARD
(SEE PAGE 4-31)
FUNCTION KEY
ED1
IC420
FL DRIVER
S IN
S OUT
S CLK
FLD CS
POWER LED
ND420
FLUORESENT INDICATOR TUBE
DM-76 BOARD
(SEE PAGE 4-35)
FUNCTION KEY
DMS1, 2
CLICK SHUTTLE
ED8
ED4/ED7/ED8
AUDIO HEAD
REC/PB
SW 12V
PS301
IC201 (2/2)
NORMAL AUDIO PROCESSOR
NORMAL AUDIO
TUNER M
T301
ERASE OSC
ERASE
Q301, 302
HEAD SWITCH
JS302
ED1/ED4
Q303, 311, 312
HEAD CONTROL SWITCH
REC P
ED7/ED8
T302
ERASE OSC
FULL ERASE
05
AC IN
POWER SUPPLY UNIT
35V
13V
6V
−13V

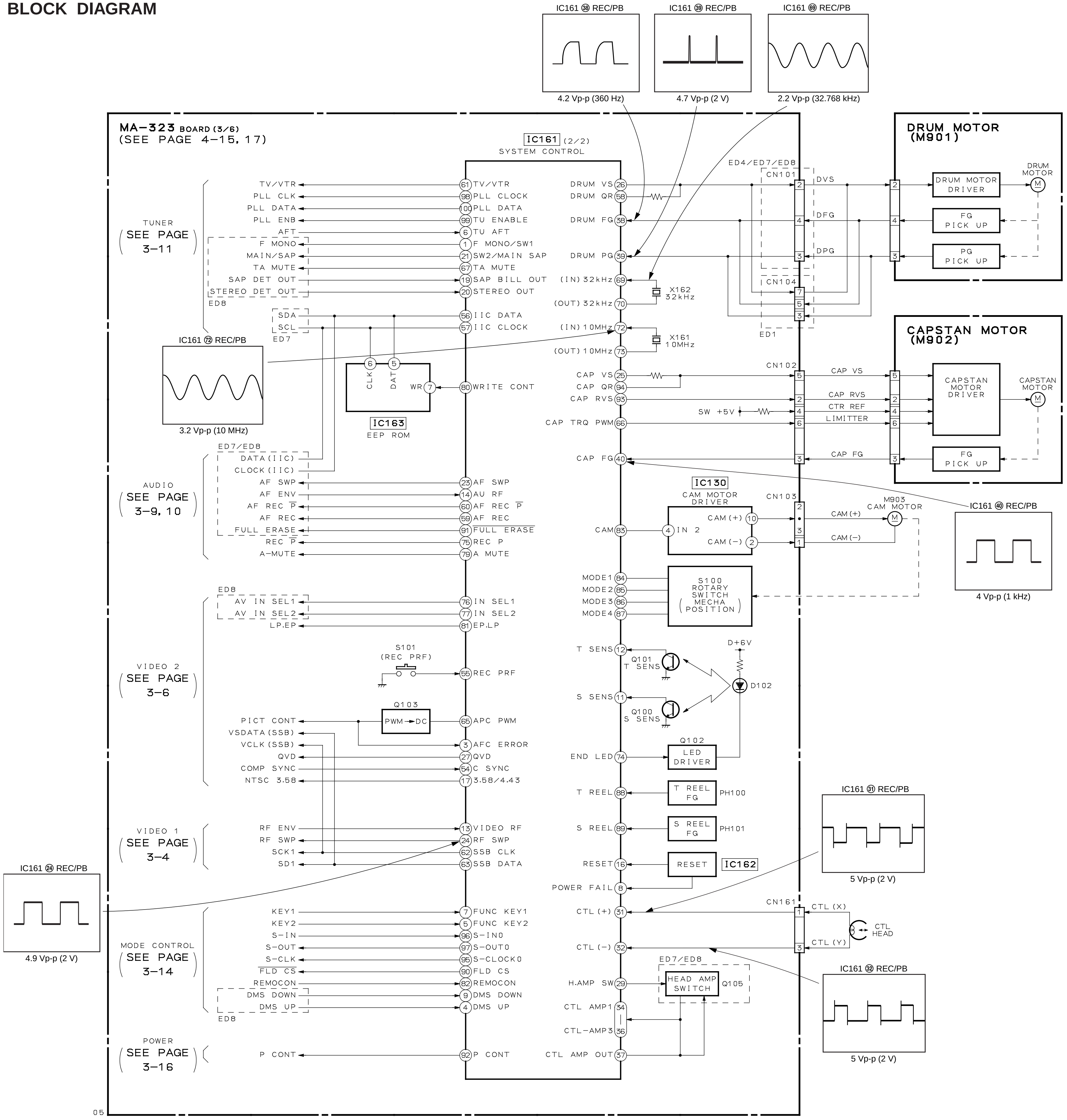
3-2. VIDEO1 BLOCK DIAGRAM


MA-323 BOARD (1/6)
(SEE PAGE 4-5)
IC501
VIDEO REC/PB AMP
VIDEO HEAD
SP CH1
SP CH2
EP CH1
EP CH2
CN502
SP CH1 F
SP CH1 S
SP CH2 F
SP CH2 S
EP CH1 F
EP CH1 S
EP CH2 F
EP CH2 S
ED4/ED7/ED8
PB
SP REC
LP REC
HPF
AMP
ENV DET
Q501
PB RF BUFFER
REC IDLE
DET
COMP
VCA
REC
LOGIC
REC ADJ
RF SWP
COMP SYNC
SD1 (SSB)
SCK1 (SSB)
C.ROT
PB RF
REC RF
VIDEO 2
(SEE PAGE 3-5)
REC CURR
PB RF
RF SWP
FOR CHECK
CN501
SERVO/SYSTEM CONTROL
(SEE PAGE 3-7)
RF ENV
RF SWP
SD1 (SSB)
SCK1 (SSB)
IC501 ㉒ PB
800m Vp-p (H)
IC501 ㉘ REC
100m Vp-p (H)
IC501 ⑰ REC/PB
5.2 Vp-p (2 V)
IC501 ㉑ REC
4.6 Vp-p (2 V)
IC501 ④ REC
2.8 Vp-p (H)
IC501 ⑱ REC/PB
2.2 Vp-p (H)
05

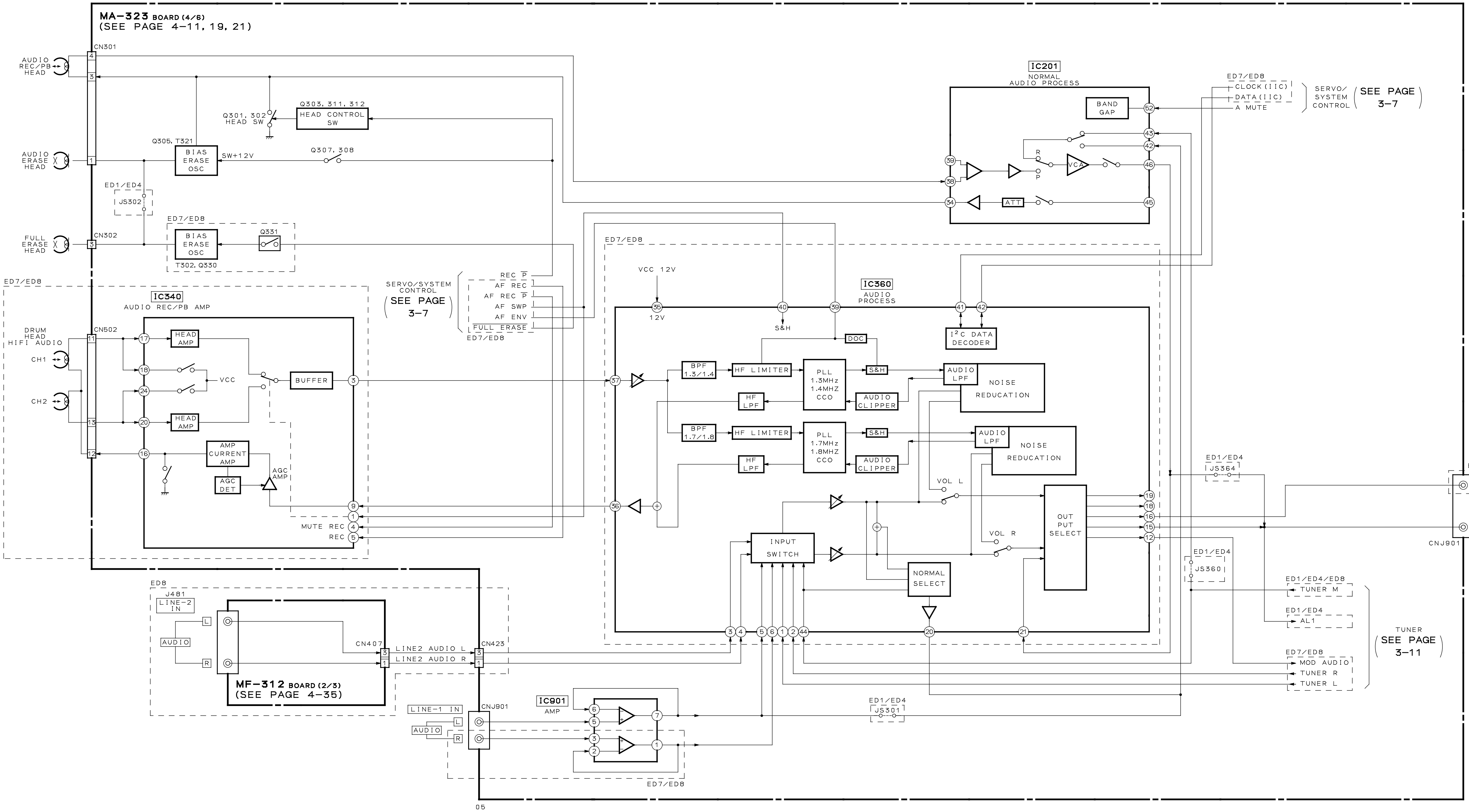
3-3. VIDEO2 BLOCK DIAGRAM


IC202 ⑤ REC/PB
360m Vp-p (H)
IC202 ⑧ REC/PB
REC: 250m Vp-p (H)
PB: 300m Vp-p (H)
IC202 ① REC/PB
REC: 400m Vp-p (H)
PB: 500m Vp-p (H)
IC201 ④ REC/PB
560m Vp-p (H)
IC201 ⑰ REC/PB
REC: 470m Vp-p (H)
PB: 260m Vp-p (H)
IC201 ⑪ REC/PB
440m Vp-p (H)
MA-323 BOARD (2/6)
(SEE PAGE 4-11, 15, 23)
IC202
1H CCD DELAY LINE
CCD
S/H
CLK
ED4/ED7/ED8
Q201
EMPH SW
IC201
Y/C PROCESS
IC201④PB
840m Vp-p (H)
PB RF
REC RF
Q209
L204 C218
1.0MHz TRAP
L213 C265
70kHz TRAP
L211 C262
1.1MHz TRAP
VIDEO1
SEE PAGE 3-4
COMP SYNC
C ROT
IC201⑥REC
400m Vp-p (H)
Q202
REC MODE SWITCH
Q207
LP.EP
VSDATA
VCLK
IC201⑦PB
840m Vp-p (H)
IC201⑯REC
370m Vp-p (H)
ME.SECAM
S-Det
Main De-emph
fo/Dev Adj S-DET
Main Emph Carrier Offset W.C/DC
FM MOD
FM AGC
Pic EQ
SDL
SW13
G EQ
DLIM
DEMO
DET
628 TRAP
LAGREAD LPF
1MHPF
AMP
7MLPF
2M LPF
SW14
SW1
Main Conv1
SW19
1.5M LPF
Delay 150n
SW20
DELAY
THROUGH
1.5M LPF
Main Conv2
VCA
SW12
LEVEL Det1
LEVEL Det2
2.2M LPF
SW30/25
Serial Cont Interface
B.Em
C.K
NTSC/PAL N.P CONT OUT
4phase Gen
1/2 2fi VCO
ME SECAM DET
CR Det 2fsc
Clock
Xtal VCO/OSC
PB/REC Discri
REC AFC
REC APC
PB APC
Color Killer ID Det
1/2 phase SW
DOWN Conv
NP Conv
APC SW1
HiFi TRAP
HPF fh TRAP
ACC
SW18
HPF
SW21
Pulse Gen
BPF
B-De emph
Killer DET OUT
N → P
Color Killer
SW17
SW16
REC C.OUT
FBC/ALC
Sub LPF
NL Emph
NL De.Emph
Y.LPF (NTSC/PAL)
SW10
DO Det
Edge Delv
DOC
SW15
Pictur Cont
SW11
0.5Vpp
N.C D.E
SSB
Clamp
DO/REC
SW6
0.4Vpp
DO
SW5
YNR
Clamp
REC AGC Det PBALC
Sync Sep
Video AGC
SW7
LPF
ATT (-10dB)
ATT (-10dB)
SW8
0.5Vpp
Feed Back Clamp Video ALC
Y.SQUELCH
CLEAR SYNC
C.SQUELCH
6dB AMP
1.0Vpp
6dB AMP
X201 3.58MHz
IC201㉖REC/PB
1.1 Vp-p (3.58 MHz)
Q210
SWITCH
PAL
C-KILL
C-KILLER DET
MODE CONTROL
SEE PAGE 3-14
ED8
IC203
INPUT SELECT
AV IN SEL1
AV IN SEL2
SERVO/SYSTEM CONTROL
SEE PAGE 3-7
CN901
SAT IN
CN407
LINE 2 VIDEO
MF-312 BOARD (1/3)
(SEE PAGE 4-35)
J481
LINE-2 IN
VIDEO
IC201 ⑯ REC
1 Vp-p (H)
PICT CONT
JS201
ED1/ED4/ED7
TU VIDEO
TUNER
SEE PAGE 3-11
MOD V
IC201 ⑰ REC/PB
2.2 Vp-p (H)
IC161 (1/2)
SYSTEM CONTROL
(ON SCREEN DISPLAY)
CV. OUT
CV. IN
Q901
BUFFER
CNJ901
LINE-1 IN
LINE OUT
VIDEO
Q400
VIDEO BUFFER
Q402
BLUE BACK SWITCH
BLUE BACK
4fsc OUT
4fsc IN
PAL
X401
14.31818MHz
IC161 ㊸,㊺ REC/PB
2 Vp-p (H)
QVD
COMP SYNC
IC201 ⑲ REC/PB
5 Vp-p (H)
IC161 ㊾ REC/PB
2.4 Vp-p (14.318 MHz)
Q204
TRAP
Q205
TRAP
IC201 ⑳ PB
640m Vp-p (H)
NTSC 3.58
PICT CONT
QVD
COMP SYNC
VSDATA (SSB)
VCLK (SSB)
LP.EP
SERVO/SYSTEM CONTROL
SEE PAGE 3-7
05

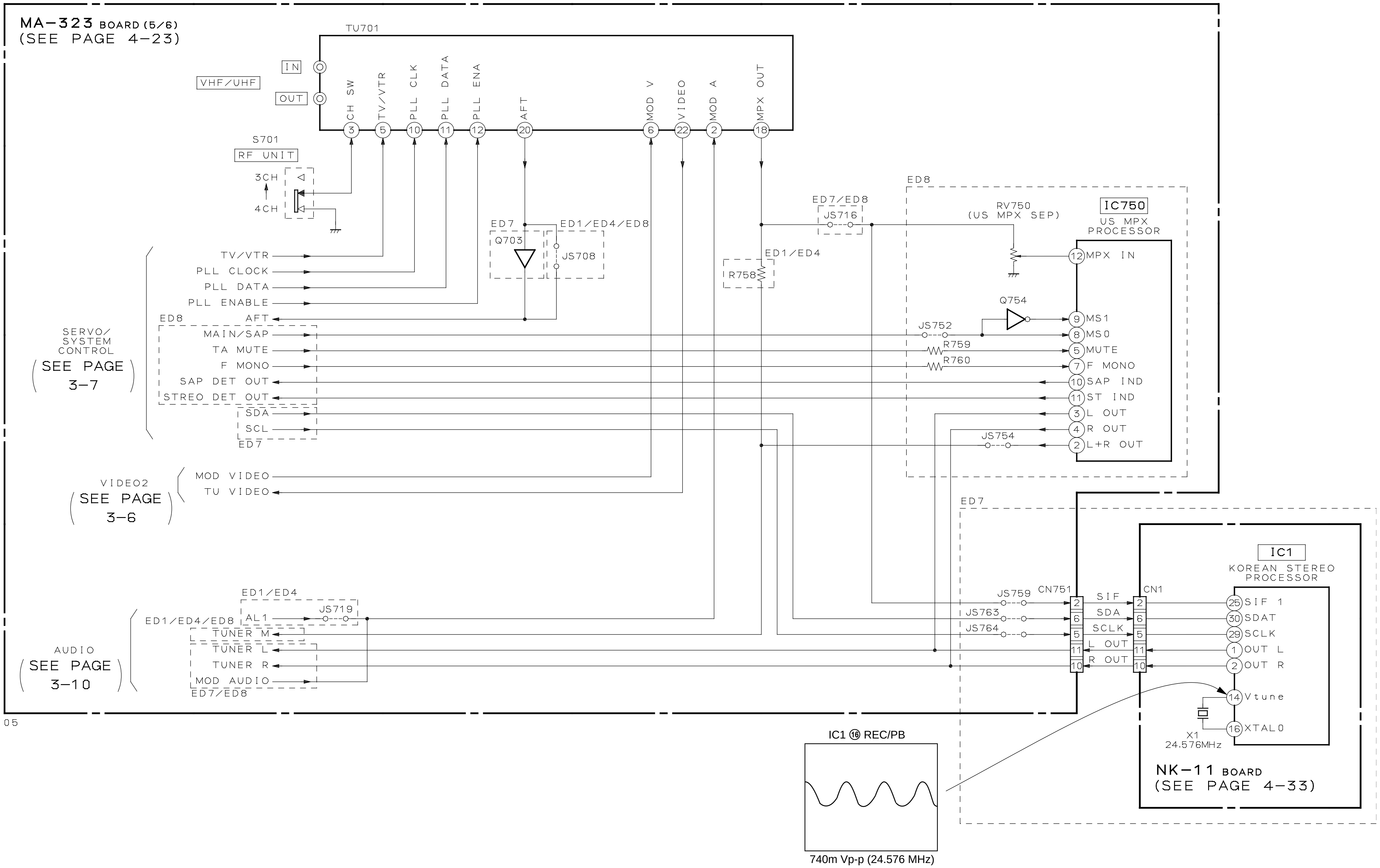
3-4. SERVO/SYSTEM CONTROL BLOCK DIAGRAM


IC161 ㊳ REC/PB
4.2 Vp-p (360 Hz)
IC161 ㊴ REC/PB
4.7 Vp-p (2 V)
IC161 ⑱ REC/PB
2.2 Vp-p (32.768 kHz)
MA-323 BOARD (3/6)
(SEE PAGE 4-15, 17)
IC161 (2/2)
SYSTEM CONTROL
TUNER
SEE PAGE 3-11
TV/VTR
PLL CLK
PLL DATA
PLL ENB
AFT
F MONO
MAIN/SAP
TA MUTE
SAP DET OUT
STEREO DET OUT
ED8
SDA
SCL
ED7
TV/VTR
PLL CLOCK
PLL DATA
TU ENABLE
TU AFT
F MONO/SW1
SW2/MAIN SAP
TA MUTE
SAP BILL OUT
STEREO OUT
IIC DATA
IIC CLOCK
WRITE CONT
DRUM VS
DRUM QR
DRUM FG
DRUM PG
(IN) 32kHz
(OUT) 32kHz
(IN) 10MHz
(OUT) 10MHz
X162 32kHz
X161 10MHz
IC161 ⑫ REC/PB
3.2 Vp-p (10 MHz)
CLK
DAT
WR
IC163
EEP ROM
ED4/ED7/ED8
CN101
DVS
DFG
DPG
CN104
ED1
DRUM MOTOR (M901)
DRUM MOTOR DRIVER
DRUM MOTOR
FG PICK UP
PG PICK UP
CAP VS
CAP QR
CAP RVS
CAP TRQ PWM
CAP FG
SW +5V
CN102
CAP RVS
CTR REF
LIMITTER
CAPSTAN MOTOR (M902)
CAPSTAN MOTOR DRIVER
CAPSTAN MOTOR
FG PICK UP
AUDIO
SEE PAGE 3-9, 10
ED7/ED8
DATA (IIC)
CLOCK (IIC)
AF SWP
AF ENV
AF REC P̄
AF REC
FULL ERASE
REC P
A-MUTE
AF SWP
AU RF
AF REC P̄
AF REC
FULL ERASE
REC P
A MUTE
IC130
CAM MOTOR DRIVER
CAM
IN 2
CAM (+)
CAM (−)
CN103
M903 CAM MOTOR
IC161 ㊵ REC/PB
4 Vp-p (1 kHz)
MODE1
MODE2
MODE3
MODE4
S100 ROTARY SWITCH (MECHA POSITION)
VIDEO 2
SEE PAGE 3-6
AV IN SEL1
AV IN SEL2
LP.EP
IN SEL1
IN SEL2
EP.LP
S101 (REC PRF)
REC PRF
Q103
PWM → DC
PICT CONT
VSDATA (SSB)
VCLK (SSB)
QVD
COMP SYNC
NTSC 3.58
APC PWM
AFC ERROR
QVD
C SYNC
3.58/4.43
T SENS
S SENS
Q101 T SENS
Q100 S SENS
D+6V
D102
END LED
Q102 LED DRIVER
T REEL
S REEL
T REEL FG
S REEL FG
PH100
PH101
RESET
POWER FAIL
IC162
VIDEO 1
SEE PAGE 3-4
RF ENV
RF SWP
SCK1
SD1
VIDEO RF
RF SWP
SSB CLK
SSB DATA
IC161 ㉔ REC/PB
4.9 Vp-p (2 V)
IC161 ㉛ REC/PB
5 Vp-p (2 V)
CN161
CTL (X)
CTL (Y)
CTL HEAD
CTL (+)
CTL (−)
MODE CONTROL
SEE PAGE 3-14
KEY1
KEY2
S-IN
S-OUT
S-CLK
FLD CS
REMOCON
DMS DOWN
DMS UP
FUNC KEY1
FUNC KEY2
S-IN0
S-OUT0
S-CLOCK0
FLD CS
REMOCON
DMS DOWN
DMS UP
H.AMP SW
CTL AMP1
CTL-AMP3
CTL AMP OUT
ED7/ED8
HEAD AMP SWITCH
Q105
IC161 ㉜ REC/PB
5 Vp-p (2 V)
POWER
SEE PAGE 3-16
P CONT
P CONT
05

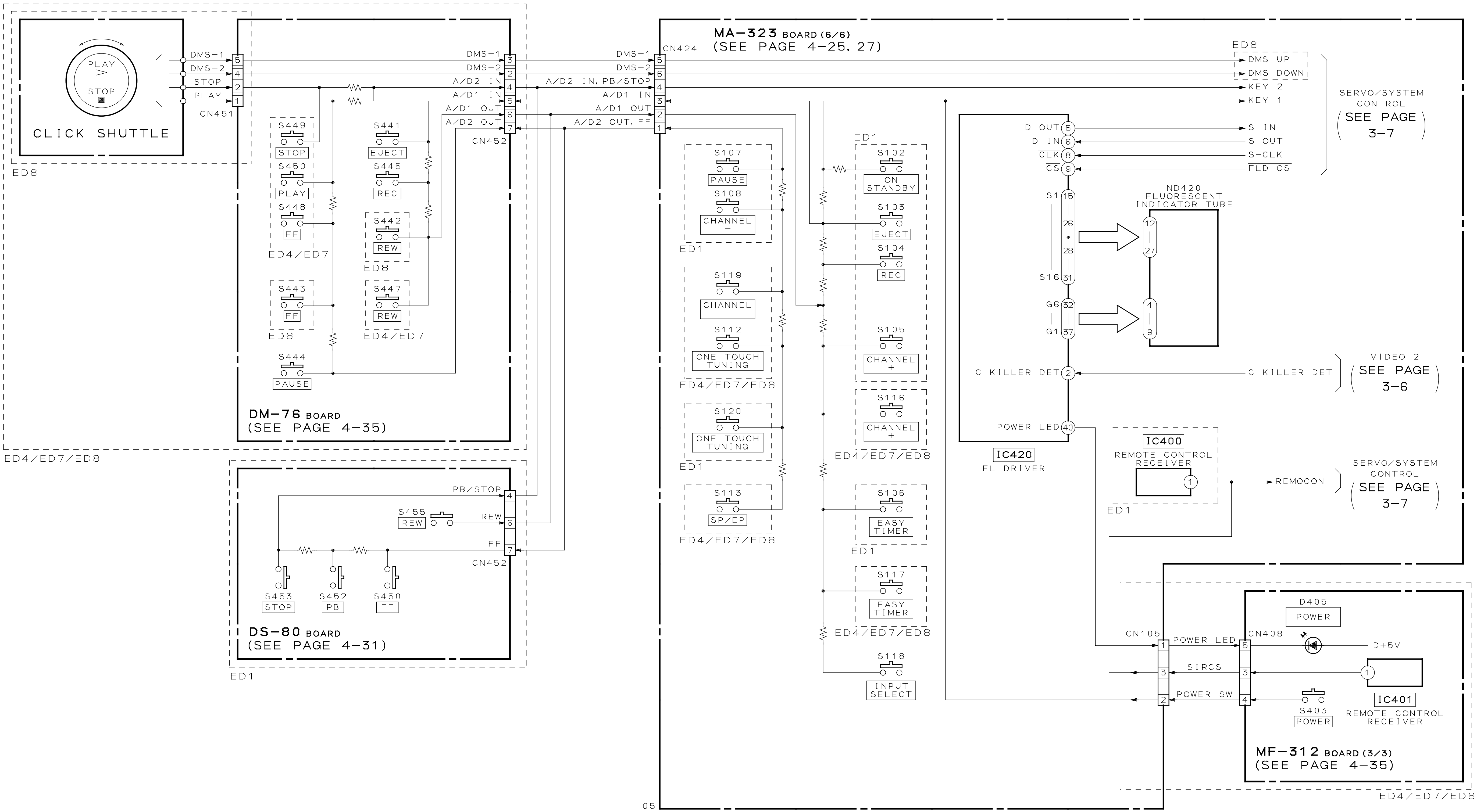
3-5. AUDIO BLOCK DIAGRAM


MA-323 BOARD (4/6)
(SEE PAGE 4-11, 19, 21)
CN301
AUDIO REC/PB HEAD
Q301, 302 HEAD SW
Q303, 311, 312
HEAD CONTROL SW
Q305, T321
AUDIO ERASE HEAD
BIAS ERASE OSC
SW+12V
Q307, 308
ED1/ED4
JS302
ED7/ED8
Q331
FULL ERASE HEAD
CN302
T302, Q330
ED7/ED8
IC340
AUDIO REC/PB AMP
DRUM HEAD HIFI AUDIO
CN502
CH1
CH2
HEAD AMP
VCC
BUFFER
AMP CURRENT AMP
AGC DET
AGC AMP
MUTE REC
REC
SERVO/SYSTEM CONTROL
SEE PAGE 3-7
REC P
AF REC
AF REC P
AF SWP
AF ENV
FULL ERASE
ED7/ED8
IC201
NORMAL AUDIO PROCESS
BAND GAP
R
P
VCA
ATT
ED7/ED8
CLOCK (IIC)
DATA (IIC)
A MUTE
SERVO/ SYSTEM CONTROL
SEE PAGE 3-7
ED7/ED8
VCC 12V
12V
S&H
IC360
AUDIO PROCESS
I²C DATA DECODER
DOC
BPF 1.3/1.4
HF LIMITER
PLL 1.3MHz 1.4MHZ CCO
S&H
AUDIO LPF
NOISE REDUCATION
HF LPF
AUDIO CLIPPER
BPF 1.7/1.8
HF LIMITER
PLL 1.7MHz 1.8MHZ CCO
S&H
AUDIO LPF
NOISE REDUCATION
HF LPF
AUDIO CLIPPER
VOL L
VOL R
INPUT SWITCH
NORMAL SELECT
OUT PUT SELECT
ED1/ED4
JS364
ED7/ED8
LINE OUT
AUDIO
R
L
CNJ901
ED1/ED4
JS360
ED1/ED4/ED8
TUNER M
ED1/ED4
AL1
TUNER
SEE PAGE 3-11
ED7/ED8
MOD AUDIO
TUNER R
TUNER L
ED8
J481
LINE-2 IN
AUDIO
L
R
CN407
LINE2 AUDIO L
LINE2 AUDIO R
CN423
MF-312 BOARD (2/3)
(SEE PAGE 4-35)
IC901
AMP
LINE-1 IN
AUDIO
L
R
CNJ901
ED1/ED4
JS301
ED7/ED8
05

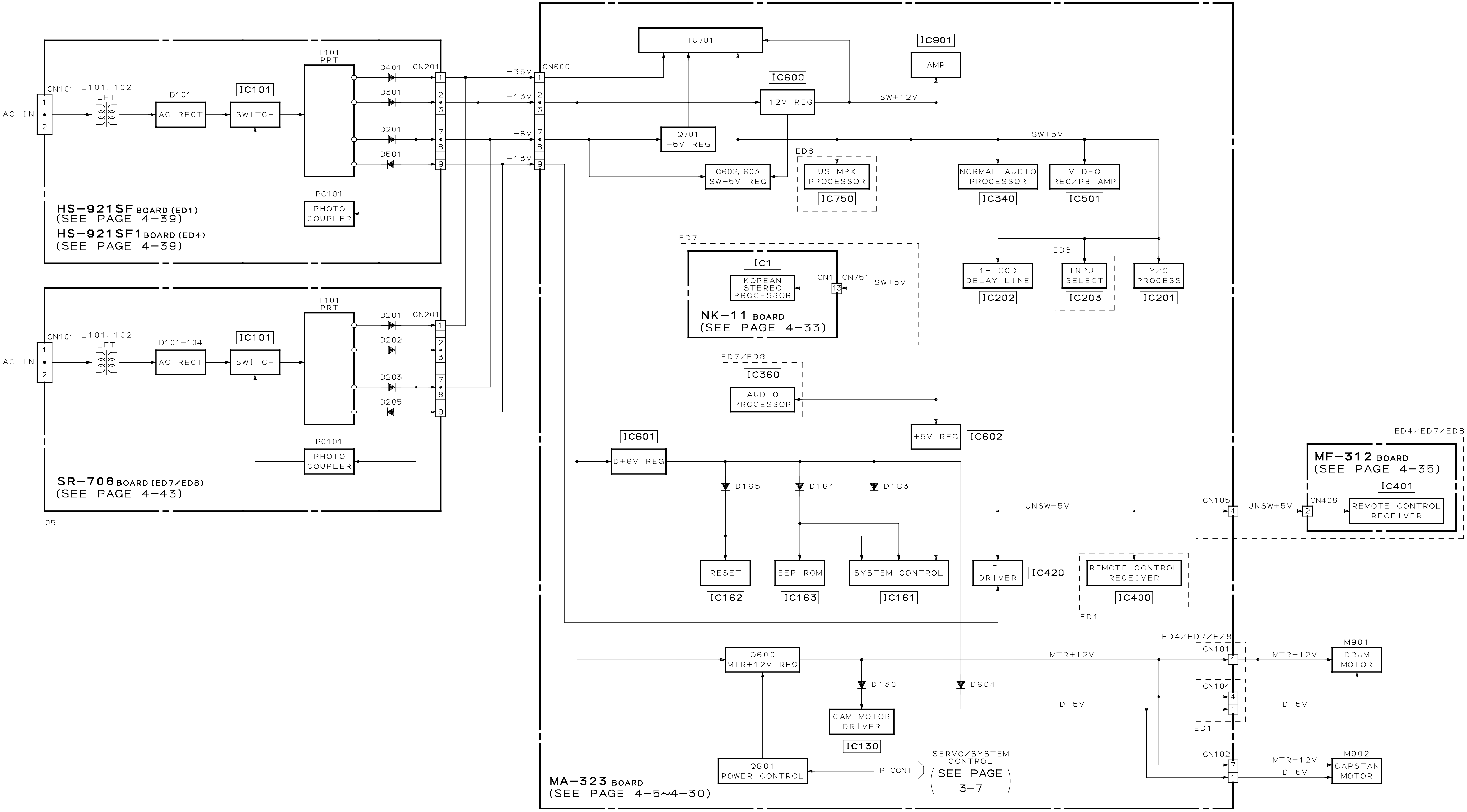
3-6. TUNER BLOCK DIAGRAM


MA-323 BOARD (5/6)
(SEE PAGE 4-23)
TU701
VHF/UHF
IN
OUT
CH SW
TV/VTR
PLL CLK
PLL DATA
PLL ENA
AFT
MOD V
VIDEO
MOD A
MPX OUT
3
5
10
11
12
20
6
22
2
18
S701
RF UNIT
3CH
4CH
ED7
Q703
ED1/ED4/ED8
JS708
ED7/ED8
JS716
ED1/ED4
R758
ED8
RV750
(US MPX SEP)
IC750
US MPX
PROCESSOR
MPX IN
Q754
JS752
R759
R760
JS754
MS1
MS0
MUTE
F MONO
SAP IND
ST IND
L OUT
R OUT
L+R OUT
SERVO/
SYSTEM
CONTROL
(SEE PAGE 3-7)
TV/VTR
PLL CLOCK
PLL DATA
PLL ENABLE
AFT
MAIN/SAP
TA MUTE
F MONO
SAP DET OUT
STREO DET OUT
SDA
SCL
ED7
VIDEO2
(SEE PAGE 3-6)
MOD VIDEO
TU VIDEO
AUDIO
(SEE PAGE 3-10)
ED1/ED4
AL1
JS719
ED1/ED4/ED8
TUNER M
TUNER L
TUNER R
MOD AUDIO
ED7/ED8
05
ED7
JS759
CN751
JS763
JS764
SIF
SDA
SCLK
L OUT
R OUT
CN1
IC1
KOREAN STEREO
PROCESSOR
SIF 1
SDAT
SCLK
OUT L
OUT R
Vtune
XTAL0
X1
24.576MHz
NK-11 BOARD
(SEE PAGE 4-33)
IC1 ⑯ REC/PB
740m Vp-p (24.576 MHz)

3-7. MODE CONTROL BLOCK DIAGRAM


PLAY
STOP
CLICK SHUTTLE
ED8
DMS-1
DMS-2
STOP
PLAY
CN451
S449 STOP
S450 PLAY
S448 FF
ED4/ED7
S441 EJECT
S445 REC
S442 REW
ED8
S443 FF
ED8
S447 REW
ED4/ED7
S444 PAUSE
DMS-1
DMS-2
A/D2 IN
A/D1 IN
A/D1 OUT
A/D2 OUT
CN452
DM-76 BOARD
(SEE PAGE 4-35)
ED4/ED7/ED8
PB/STOP
S455 REW
REW
FF
CN452
S453 STOP
S452 PB
S450 FF
DS-80 BOARD
(SEE PAGE 4-31)
ED1
DMS-1
DMS-2
A/D2 IN, PB/STOP
A/D1 IN
A/D1 OUT
A/D2 OUT, FF
CN424
MA-323 BOARD (6/6)
(SEE PAGE 4-25, 27)
S107 PAUSE
S108 CHANNEL −
ED1
S119 CHANNEL −
S112 ONE TOUCH TUNING
ED4/ED7/ED8
S120 ONE TOUCH TUNING
ED1
S113 SP/EP
ED4/ED7/ED8
ED1
S102 ON STANDBY
S103 EJECT
S104 REC
S105 CHANNEL +
S116 CHANNEL +
ED4/ED7/ED8
S106 EASY TIMER
ED1
S117 EASY TIMER
ED4/ED7/ED8
S118 INPUT SELECT
D OUT 5
D IN 6
CLK 8
CS 9
S1 15
26
28
S16 31
G6 32
G1 37
C KILLER DET 2
POWER LED 40
IC420
FL DRIVER
ND420
FLUORESCENT
INDICATOR TUBE
12
27
4
9
ED8
DMS UP
DMS DOWN
KEY 2
KEY 1
S IN
S OUT
S-CLK
FLD CS
SERVO/SYSTEM CONTROL
SEE PAGE 3-7
C KILLER DET
VIDEO 2
SEE PAGE 3-6
IC400
REMOTE CONTROL RECEIVER
ED1
REMOCON
SERVO/SYSTEM CONTROL
SEE PAGE 3-7
CN105
POWER LED
SIRCS
POWER SW
CN408
D405 POWER
D+5V
S403 POWER
IC401
REMOTE CONTROL RECEIVER
MF-312 BOARD (3/3)
(SEE PAGE 4-35)
ED4/ED7/ED8
05

3-8. POWER BLOCK DIAGRAM


AC IN
CN101
1
2
L101, 102
LFT
D101
AC RECT
IC101
SWITCH
T101
PRT
D401
D301
D201
D501
CN201
PC101
PHOTO COUPLER
HS-921SF BOARD (ED1)
(SEE PAGE 4-39)
HS-921SF1 BOARD (ED4)
(SEE PAGE 4-39)
AC IN
CN101
L101, 102
LFT
D101-104
AC RECT
IC101
SWITCH
T101
PRT
D201
D202
D203
D205
CN201
PC101
PHOTO COUPLER
SR-708 BOARD (ED7/ED8)
(SEE PAGE 4-43)
05
+35V
+13V
+6V
-13V
CN600
TU701
IC600
+12V REG
SW+12V
IC901
AMP
Q701
+5V REG
Q602, 603
SW+5V REG
ED8
US MPX PROCESSOR
IC750
SW+5V
NORMAL AUDIO PROCESSOR
IC340
VIDEO REC/PB AMP
IC501
ED7
IC1
KOREAN STEREO PROCESSOR
CN1
CN751
13
SW+5V
NK-11 BOARD
(SEE PAGE 4-33)
1H CCD DELAY LINE
IC202
ED8
INPUT SELECT
IC203
Y/C PROCESS
IC201
ED7/ED8
IC360
AUDIO PROCESSOR
IC601
D+6V REG
+5V REG
IC602
D165
D164
D163
UNSW+5V
RESET
IC162
EEP ROM
IC163
SYSTEM CONTROL
IC161
FL DRIVER
IC420
REMOTE CONTROL RECEIVER
IC400
ED1
ED4/ED7/ED8
MF-312 BOARD
(SEE PAGE 4-35)
IC401
CN105
UNSW+5V
CN408
REMOTE CONTROL RECEIVER
Q600
MTR+12V REG
D130
D604
MTR+12V
ED4/ED7/EZ8
CN101
MTR+12V
M901
DRUM MOTOR
CN104
D+5V
D+5V
ED1
CAM MOTOR DRIVER
IC130
CN102
MTR+12V
D+5V
M902
CAPSTAN MOTOR
Q601
POWER CONTROL
P CONT
SERVO/SYSTEM CONTROL
SEE PAGE 3-7
MA-323 BOARD
(SEE PAGE 4-5~4-30)

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary mote is printed in each block.)

For printed wiring boards:

- o——— : indicates a lead wire mounted on the component side.
- ●——— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ▒ : Pattern from the side which enables seeing.

Caution:	
Pattern face side: (Side B)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Side A)	Parts on the parts face side seen from the parts face are indicated.

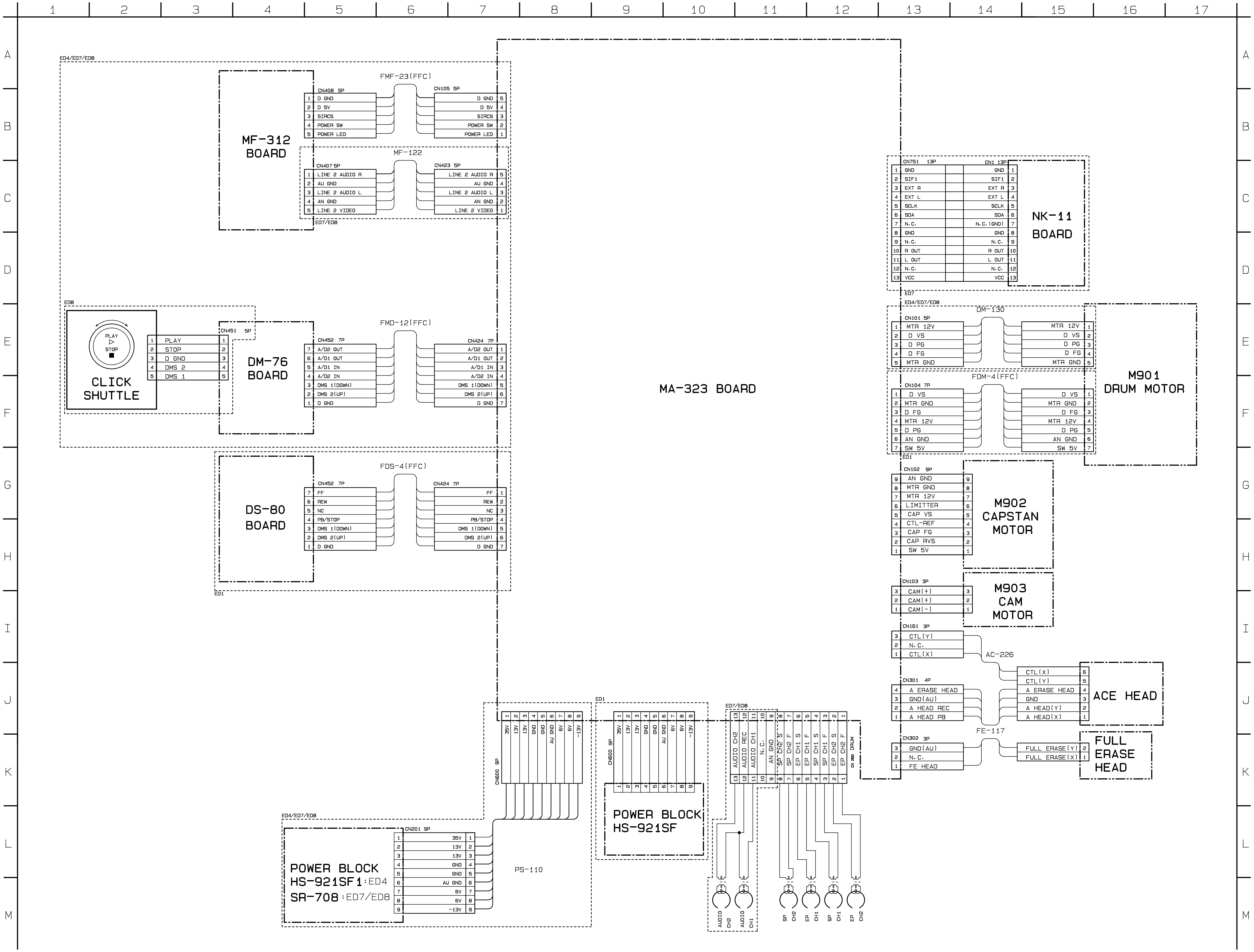
For schematic Diagram:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4 W (Chip resistors : 1/10 W) unless otherwise specified.
  kΩ : 1000Ω, MW : 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- —⊡— : nonflammable resistor.
- —⊡•— : fusible resistor.
- ▭ : panel designation.
- △ : internal component.
- ▭ : adjustment for repair.
- **B+** : B+ Line.
- **B–** : B– Line.
- Circled numbers refer to waveforms.
- Voltages are dc between measurement point.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC 10MW).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

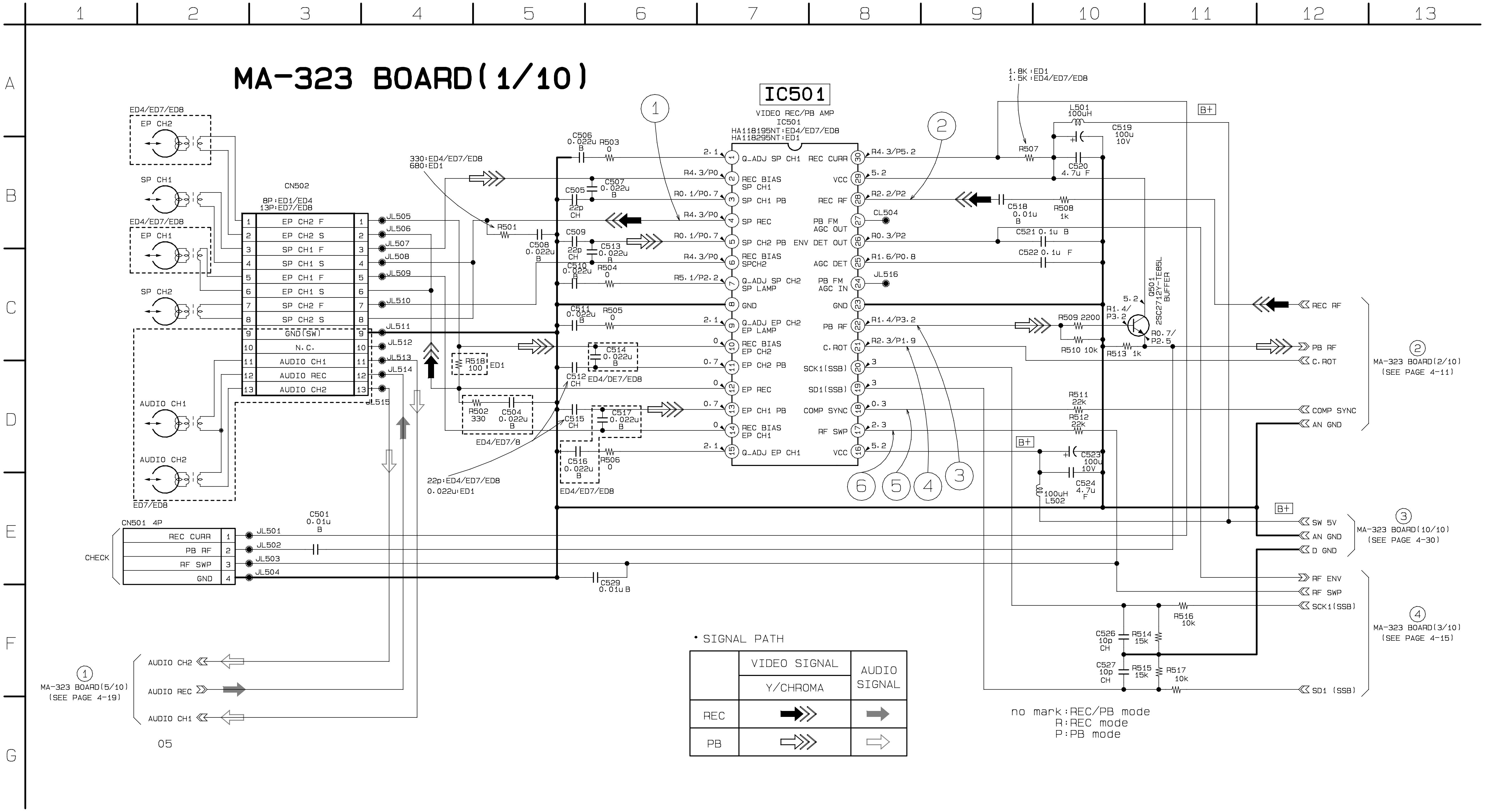
4-1. FRAME SCHEMATIC DIAGRAM


ED4/ED7/ED8
MF-312 BOARD
FMF-23(FFC)
CN408 5P
1 D GND
2 D 5V
3 SIRCS
4 POWER SW
5 POWER LED
CN105 5P
D GND 5
D 5V 4
SIRCS 3
POWER SW 2
POWER LED 1
MF-122
CN407 5P
1 LINE 2 AUDIO R
2 AU GND
3 LINE 2 AUDIO L
4 AN GND
5 LINE 2 VIDEO
CN423 5P
LINE 2 AUDIO R 5
AU GND 4
LINE 2 AUDIO L 3
AN GND 2
LINE 2 VIDEO 1
ED7/ED8
ED8
PLAY
STOP
CLICK SHUTTLE
1 PLAY
2 STOP
3 D GND
4 DMS 2
5 DMS 1
CN451 5P
DM-76 BOARD
FMD-12(FFC)
CN452 7P
7 A/D2 OUT
6 A/D1 OUT
5 A/D1 IN
4 A/D2 IN
3 DMS 1(DOWN)
2 DMS 2(UP)
1 D GND
CN424 7P
A/D2 OUT 1
A/D1 OUT 2
A/D1 IN 3
A/D2 IN 4
DMS 1(DOWN) 5
DMS 2(UP) 6
D GND 7
DS-80 BOARD
FDS-4(FFC)
CN452 7P
7 FF
6 REW
5 NC
4 PB/STOP
3 DMS 1(DOWN)
2 DMS 2(UP)
1 D GND
CN424 7P
FF 1
REW 2
NC 3
PB/STOP 4
DMS 1(DOWN) 5
DMS 2(UP) 6
D GND 7
ED1
MA-323 BOARD
CN751 13P
1 GND
2 SIF1
3 EXT R
4 EXT L
5 SCLK
6 SDA
7 N.C.
8 GND
9 N.C.
10 R OUT
11 L OUT
12 N.C.
13 VCC
CN1 13P
GND 1
SIF1 2
EXT R 3
EXT L 4
SCLK 5
SDA 6
N.C.(GND) 7
GND 8
N.C. 9
R OUT 10
L OUT 11
N.C. 12
VCC 13
NK-11 BOARD
ED7
ED4/ED7/ED8
DM-130
CN101 5P
1 MTR 12V
2 D VS
3 D PG
4 D FG
5 MTR GND
MTR 12V 1
D VS 2
D PG 3
D FG 4
MTR GND 5
FDM-4(FFC)
CN104 7P
1 D VS
2 MTR GND
3 D FG
4 MTR 12V
5 D PG
6 AN GND
7 SW 5V
D VS 1
MTR GND 2
D FG 3
MTR 12V 4
D PG 5
AN GND 6
SW 5V 7
M901 DRUM MOTOR
ED1
CN102 9P
9 AN GND
8 MTR GND
7 MTR 12V
6 LIMITTER
5 CAP VS
4 CTL-REF
3 CAP FG
2 CAP RVS
1 SW 5V
M902 CAPSTAN MOTOR
CN103 3P
3 CAM(+)
2 CAM(+)
1 CAM(-)
M903 CAM MOTOR
CN161 3P
3 CTL(Y)
2 N.C.
1 CTL(X)
AC-226
CTL(X) 6
CTL(Y) 5
A ERASE HEAD 4
GND 3
A HEAD(Y) 2
A HEAD(X) 1
ACE HEAD
CN301 4P
4 A ERASE HEAD
3 GND(AU)
2 A HEAD REC
1 A HEAD PB
FE-117
CN302 3P
3 GND(AU)
2 N.C.
1 FE HEAD
FULL ERASE(Y) 2
FULL ERASE(X) 1
FULL ERASE HEAD
CN600 9P
35V 13V 13V GND GND AU GND 6V 6V -13V
ED1
CN600 9P
35V 13V 13V GND GND AU GND 6V 6V -13V
POWER BLOCK HS-921SF
ED7/ED8
AUDIO CH2
AUDIO REC
AUDIO CH1
N.C.
AN GND
SP CH2 S
SP CH2 F
EP CH1 S
EP CH1 F
SP CH1 S
SP CH1 F
EP CH2 S
EP CH2 F
CN 200 DRUM
ED4/ED7/ED8
CN201 9P
1 35V
2 13V
3 13V
4 GND
5 GND
6 AU GND
7 6V
8 6V
9 -13V
POWER BLOCK HS-921SF1 : ED4
SR-708 : ED7/ED8
PS-110
AUDIO CH2
AUDIO CH1
SP CH2
EP CH1
SP CH1
EP CH2

4-2. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

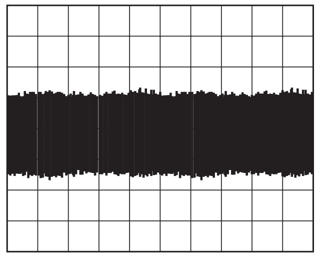
MA-323 (HEAD AMP) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.

– Ref. No.: MA-323 board; 2,000 series –


MA-323 BOARD(1/10)
IC501
VIDEO REC/PB AMP
IC501
HA118195NT:ED4/ED7/ED8
HA118295NT:ED1
CN502
8P:ED1/ED4
13P:ED7/ED8
EP CH2 F
EP CH2 S
SP CH1 F
SP CH1 S
EP CH1 F
EP CH1 S
SP CH2 F
SP CH2 S
GND(SW)
N.C.
AUDIO CH1
AUDIO REC
AUDIO CH2
CN501 4P
CHECK
REC CURR
PB RF
RF SWP
GND
Q501
2SC2712Y-TE85L
BUFFER
REC RF
PB RF
C.ROT
COMP SYNC
AN GND
MA-323 BOARD(2/10)
(SEE PAGE 4-11)
SW 5V
AN GND
D GND
MA-323 BOARD(10/10)
(SEE PAGE 4-30)
RF ENV
RF SWP
SCK1(SSB)
SD1 (SSB)
MA-323 BOARD(3/10)
(SEE PAGE 4-15)
AUDIO CH2
AUDIO REC
AUDIO CH1
MA-323 BOARD(5/10)
(SEE PAGE 4-19)
• SIGNAL PATH
VIDEO SIGNAL
Y/CHROMA
AUDIO SIGNAL
REC
PB
no mark:REC/PB mode
R:REC mode
P:PB mode

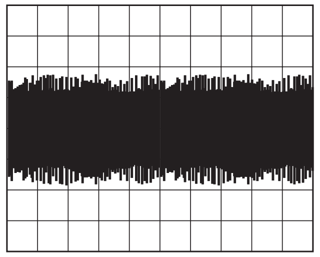
• Waveforms

❶ IC501 ④ REC



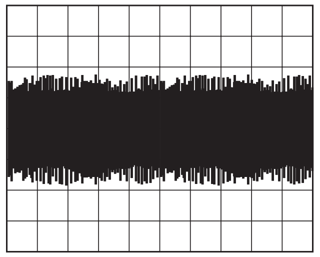
2.8 Vp-p (H)

❷ IC501 ㉘ REC



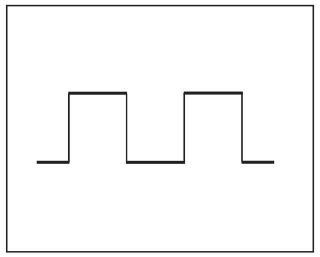
100m Vp-p (H)

❸ IC501 ㉒ PB



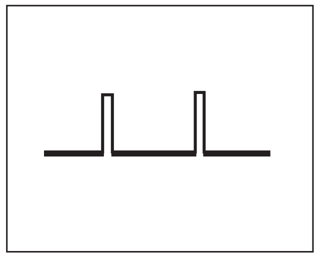
800m Vp-p (H)

❹ IC501 ㉑ REC/PB



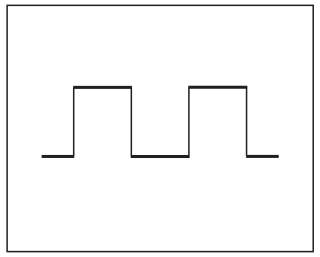
4.6 Vp-p (2 V)

❺ IC501 ⑱ REC/PB

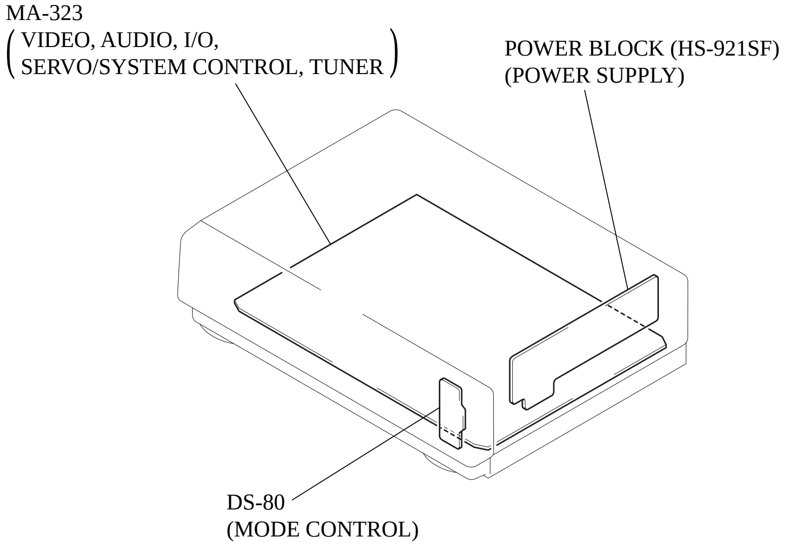


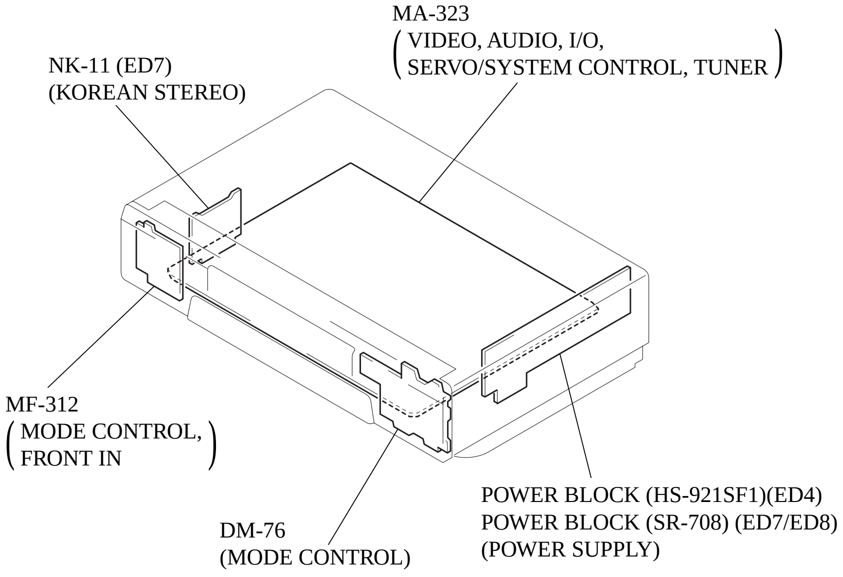
2.2 Vp-p (H)

❻ IC501 ⑰ REC/PB



5.2 Vp-p (2 V)


MA-323
(VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER)
POWER BLOCK (HS-921SF)
(POWER SUPPLY)
DS-80
(MODE CONTROL)


MA-323
(VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER)
NK-11 (ED7)
(KOREAN STEREO)
MF-312
(MODE CONTROL,
FRONT IN)
DM-76
(MODE CONTROL)
POWER BLOCK (HS-921SF1)(ED4)
POWER BLOCK (SR-708) (ED7/ED8)
(POWER SUPPLY)

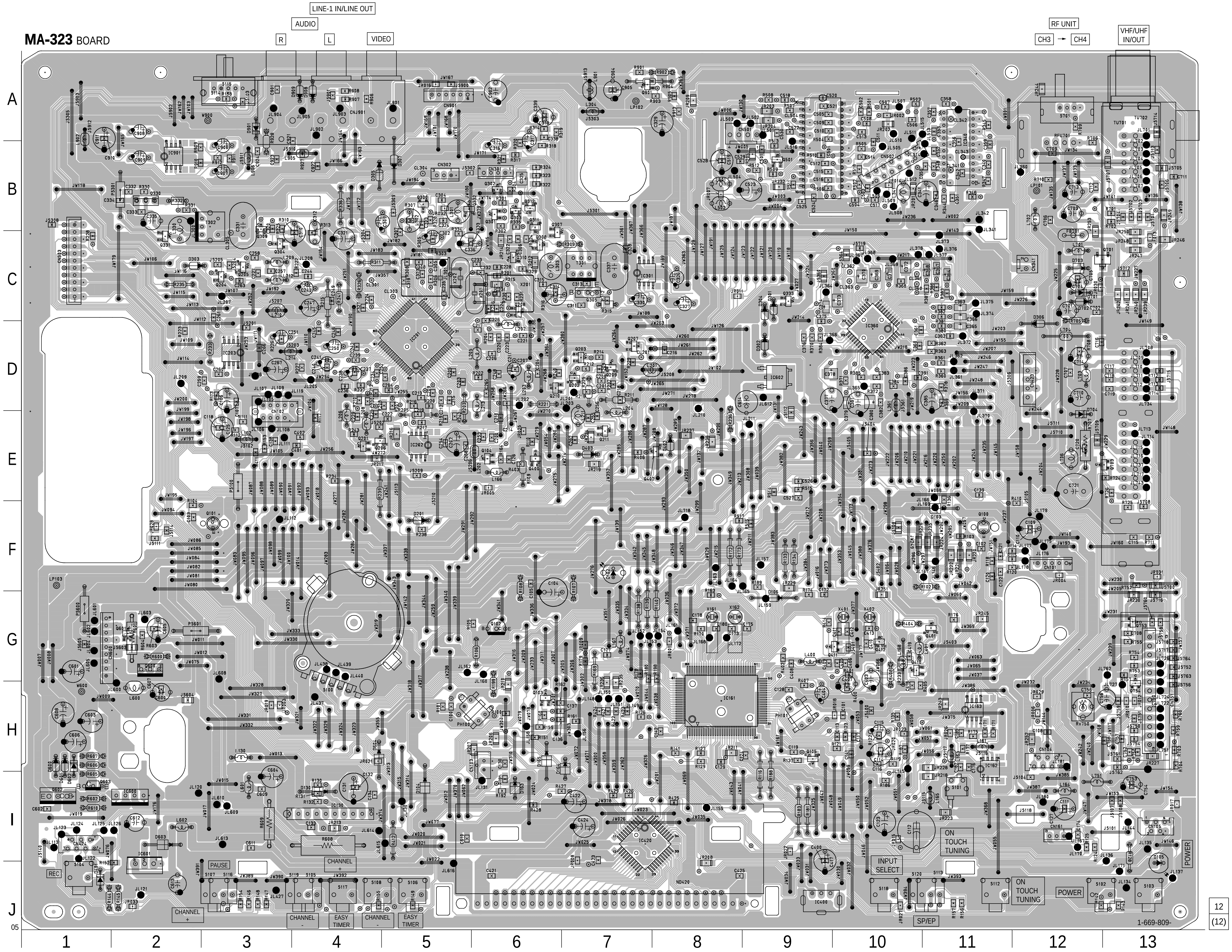
MA-323 BOARD

CN101	F-12
CN102	E-3
CN103	H-6
CN104	H-12
CN105	I-13
CN161	I-12
CN301	B-6
CN302	B-5
CN341	C-12
CN423	D-12
CN424	I-1
CN501	A-9
CN502	B-10
CN600	G-1
CN751	H-13
D102	F-7
D103	F-11
D104	I-5
D105	J-13
D106	G-9
D130	I-4
D163	I-6
D164	I-7
D165	H-6
D305	B-5
D306	D-12
D307	B-5
D401	J-1
D402	E-8
D403	E-7
D600	H-1
D601	H-1
D602	H-1
D603	I-2
D604	H-5
D701	C-12
D702	C-12
D704	E-12
D908	A-4
D909	A-4
IC130	I-4
IC161	H-8
IC162	I-11
IC163	H-11
IC201	D-5
IC202	E-5
IC203	D-3
IC340	B-11
IC360	D-10
IC400	J-9
IC420	I-7
IC501	B-9
IC600	I-2
IC601	J-2
IC602	D-9
IC750	H-13
IC901	B-2
Q100	F-11
Q101	F-3
Q102	G-6
Q103	H-6
Q105	H-9
Q201	E-4
Q202	D-7
Q204	C-3
Q205	C-3
Q207	D-7
Q208	C-6
Q209	D-7
Q210	D-6
Q301	B-6
Q302	B-6
Q303	B-6
Q305	C-7
Q307	C-6
Q308	C-6
Q311	B-6
Q312	B-6
Q330	B-2
Q331	C-2
Q332	B-6
Q400	E-6
Q402	E-8
Q501	B-9
Q600	G-2
Q601	G-2
Q602	I-1
Q603	I-1
Q701	C-13
Q703	E-13
Q754	H-13
Q901	A-7

MA-323 (HEAD AMP, VIDEO, AUDIO, IO, SERVO/SYSTEM CONTROL, TUNER) PRINTED WIRING BOARD

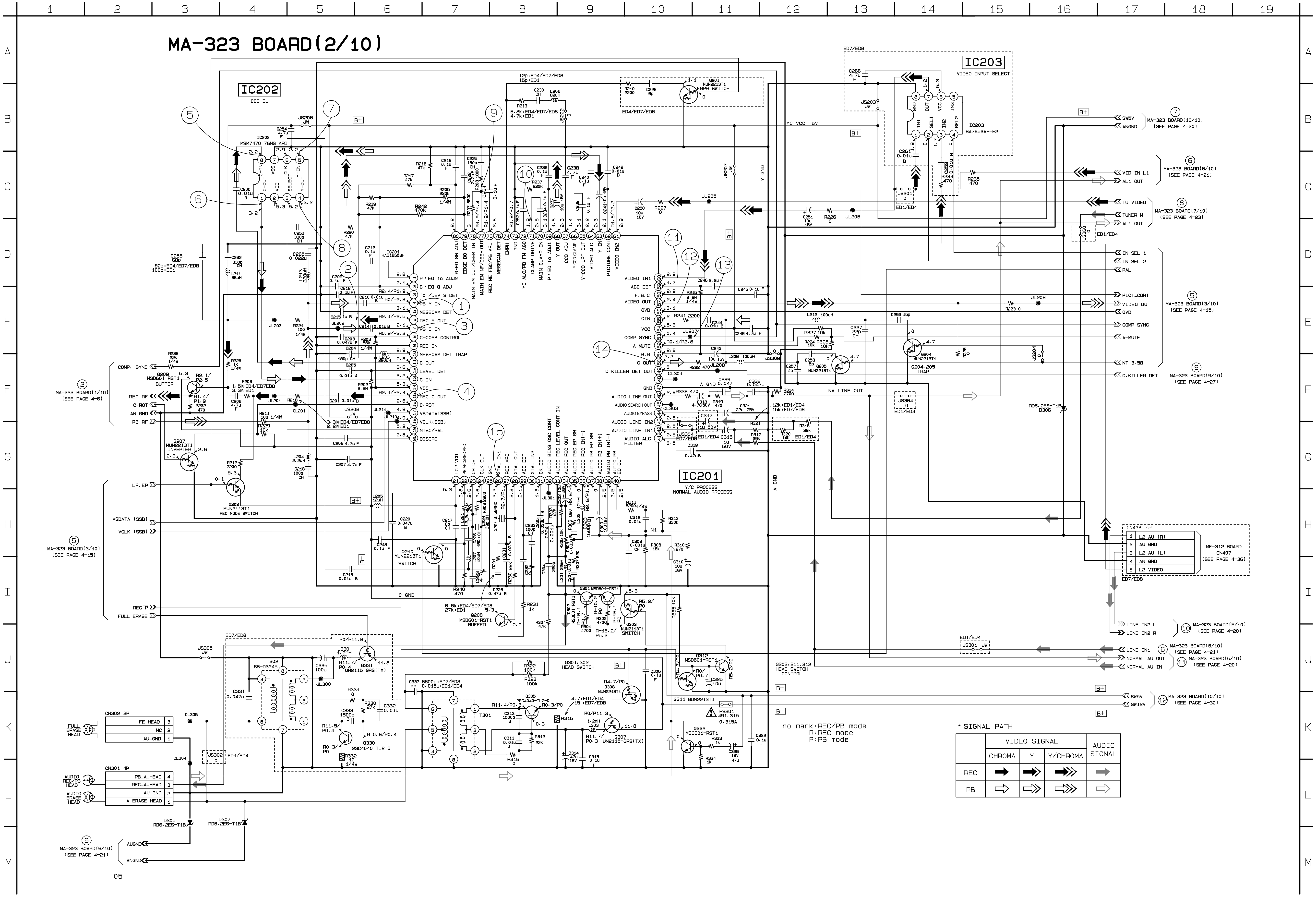
– Ref. No.: MA-323 board; 2,000 series –

There are few cases that the part isn't mounted in this model is printed on this diagram.


MA-323 BOARD
LINE-1 IN/LINE OUT
AUDIO
R
L
VIDEO
RF UNIT
CH3
CH4
VHF/UHF IN/OUT
A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7
8
9
10
11
12
13
REC
PAUSE
CHANNEL +
CHANNEL -
EASY TIMER
CHANNEL -
EASY TIMER
INPUT SELECT
SP/EP
ON TOUCH TUNING
ON TOUCH TUNING
POWER
POWER
12
(12)
1-669-809-
05

MA-323 (VIDEO, AUDIO) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.

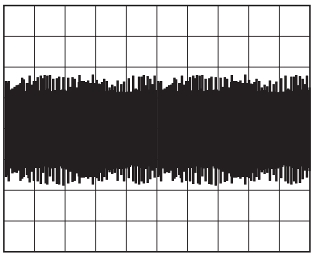
– Ref. No.: MA-323 board; 2,000 series –


MA-323 BOARD(2/10)
IC202
CCD DL
IC202 MSM7470-76MS-KR1
IC201 HA118503F
IC201
Y/C PROCESS
NORMAL AUDIO PROCESS
IC203
VIDEO INPUT SELECT
IC203 BA7653AF-E2
Q201 MUN2213T1 EMPH SWITCH
Q209 MSD601-RST1 BUFFER
Q207 MUN2213T1 INVERTER
Q202 MUN2113T1 REC MODE SWITCH
Q210 MUN2213T1 SWITCH
Q208 MSD601-RST1 BUFFER
Q204, 205 TRAP
Q303 MUN2113T1 SWITCH
Q301-302 HEAD SWITCH
Q311 MUN2213T1
Q303, 311, 312 HEAD SWITCH CONTROL
CN423 5P
MF-312 BOARD CN407 (SEE PAGE 4-36)
CN302 3P
FULL ERASE HEAD
CN301 4P
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
MA-323 BOARD(1/10) (SEE PAGE 4-6)
MA-323 BOARD(3/10) (SEE PAGE 4-15)
MA-323 BOARD(6/10) (SEE PAGE 4-21)
MA-323 BOARD(10/10) (SEE PAGE 4-30)
MA-323 BOARD(7/10) (SEE PAGE 4-23)
MA-323 BOARD(9/10) (SEE PAGE 4-27)
MA-323 BOARD(5/10) (SEE PAGE 4-20)
no mark:REC/PB mode
R:REC mode
P:PB mode
• SIGNAL PATH
VIDEO SIGNAL
CHROMA
Y
Y/CHROMA
AUDIO SIGNAL
REC
PB
05

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

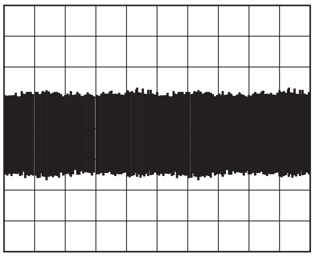
- **Waveforms**

❶ IC201 ④ PB



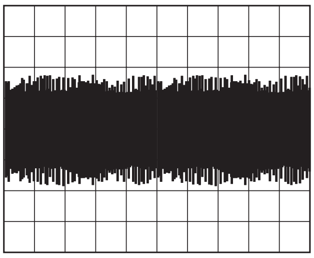
840m Vp-p (H)

❷ IC201 ⑥ REC



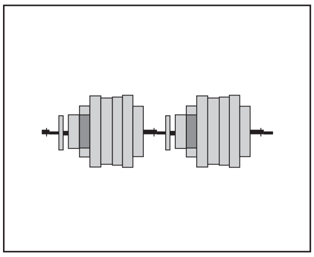
400m Vp-p (H)

❸ IC201 ⑦ PB



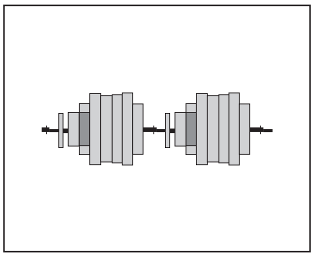
840m Vp-p (H)

❹ IC201 ⑮ REC



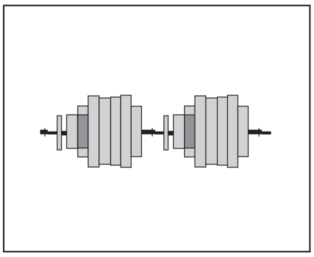
370m Vp-p (H)

❺ IC202 ⑧ REC/PB



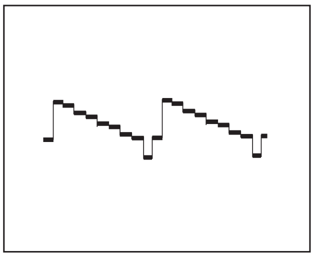
REC: 250m Vp-p (H)
PB : 300m Vp-p (H)

❻ IC202 ① REC/PB



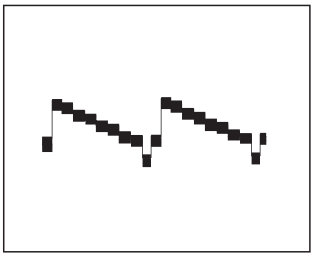
REC: 400m Vp-p (H)
PB : 500m Vp-p (H)

❼ IC202 ⑤ REC/PB



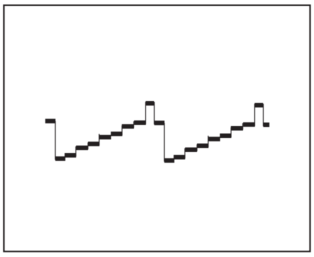
360m Vp-p (H)

❽ IC202 ④ REC/PB



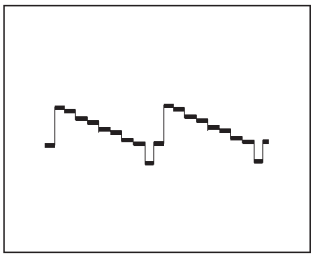
560m Vp-p (H)

❾ IC201 (77) REC/PB



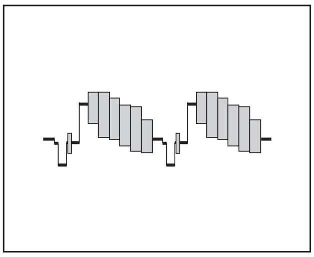
REC: 470m Vp-p (H)
PB : 260m Vp-p (H)

❿ IC201 (71) REC/PB



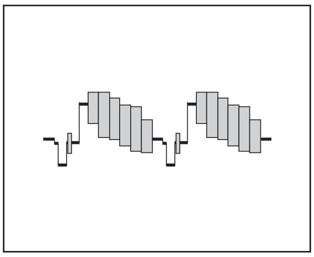
440m Vp-p (H)

⓫ IC201 (60) REC



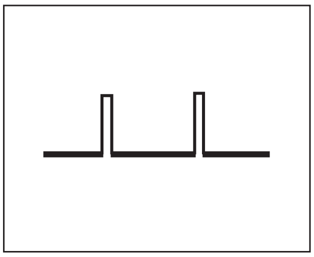
1 Vp-p (H)

⓬ IC201 (57) REC/PB



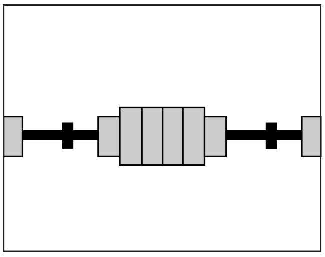
2.2 Vp-p (H)

⓭ IC201 (53) REC/PB



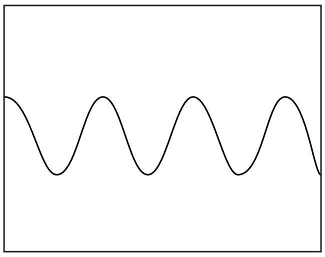
5 Vp-p (H)

⓮ IC201 (60) PB



640m Vp-p (H)

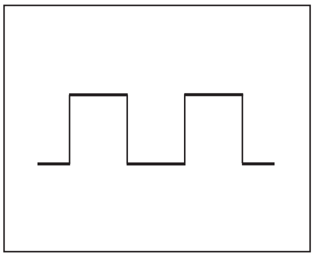
⓯ IC201 ㉖ REC/PB



1.1 Vp-p (3.58 MHz)

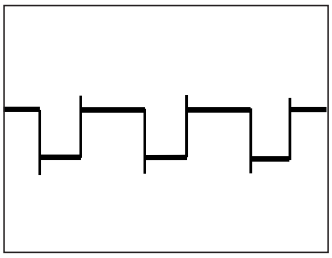
- **Waveforms**

❶ IC161 ㉔ REC/PB



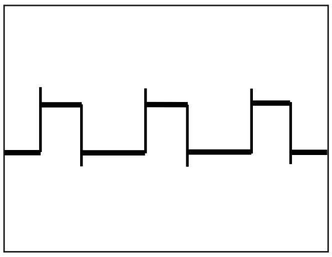
4.9 Vp-p (2 V)

❷ IC161 ㉛ REC



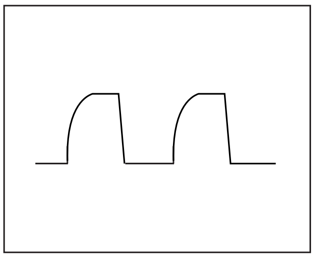
5 Vp-p (2 V)

❸ IC161 ㉜ REC



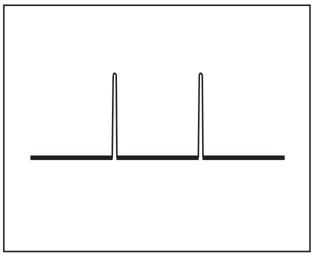
5 Vp-p (2 V)

❹ IC161 ㊳ REC/PB



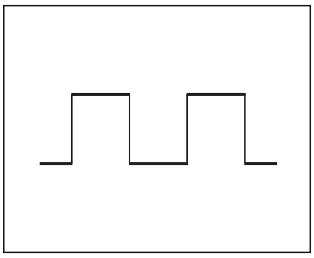
4.2 Vp-p (360 Hz)

❺ IC161 ㊴ REC/PB



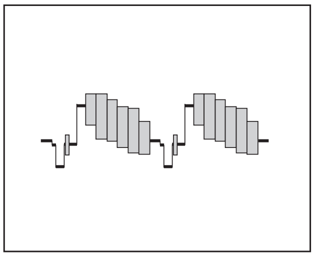
4.7 Vp-p (2 V)

❻ IC161 ㊵ REC/PB



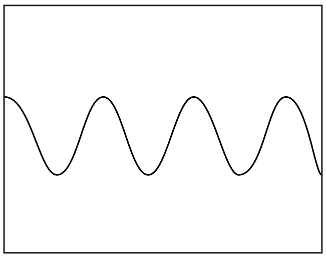
4 Vp-p (1 kHz)

❼ IC161 ㊸,㊺ REC/PB



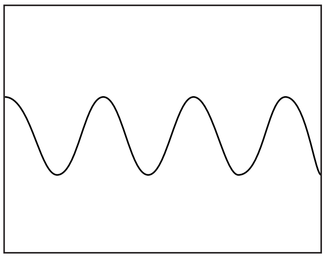
2 Vp-p (H)

❽ IC161 (52) REC/PB



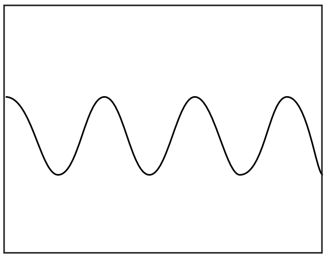
2.4 Vp-p (14.318 MHz)

❾ IC161 (69) REC/PB



2.2 Vp-p (32.768 kHz)

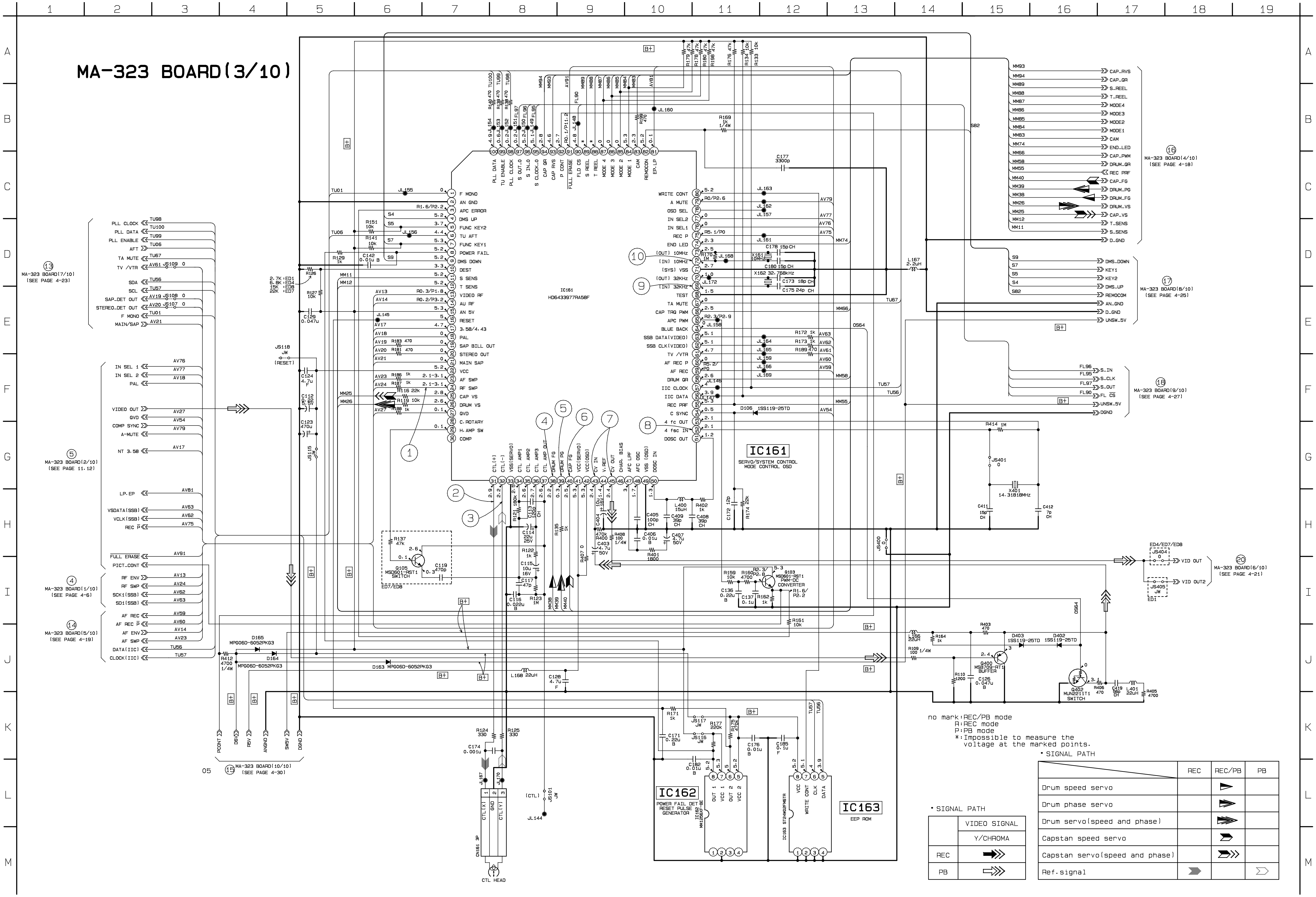
❿ IC161 (72) REC/PB



3.2 Vp-p (10 MHz)

MA-323 (SYSTEM CONTROL) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.

– Ref. No.: MA-323 board; 2,000 series –


MA-323 BOARD(3/10)
IC161
HD6433977RA58F
IC161
SERVO/SYSTEM CONTROL
MODE CONTROL OSD
IC162
POWER FAIL DET
RESET PULSE
GENERATOR
IC163
EEP ROM
Q103
MSD601-RST1
PWM-DC
CONVERTER
Q105
MSD601-RST1
SWITCH
ED7/ED8
Q400
MSB709-RT1
BUFFER
Q402
MUN2211T1
SWITCH
X401
14.31818MHz
CN161 3P
CTL HEAD
(13) MA-323 BOARD(7/10)
(SEE PAGE 4-23)
(5) MA-323 BOARD(2/10)
(SEE PAGE 11.12)
(4) MA-323 BOARD(1/10)
(SEE PAGE 4-6)
(14) MA-323 BOARD(5/10)
(SEE PAGE 4-19)
(15) MA-323 BOARD(10/10)
(SEE PAGE 4-30)
(16) MA-323 BOARD(4/10)
(SEE PAGE 4-18)
(17) MA-323 BOARD(8/10)
(SEE PAGE 4-25)
(18) MA-323 BOARD(9/10)
(SEE PAGE 4-27)
(20) MA-323 BOARD(6/10)
(SEE PAGE 4-21)
PLL CLOCK
PLL DATA
PLL ENABLE
AFT
TA MUTE
TV /VTR
SDA
SCL
SAP_DET OUT
STEREO_DET OUT
F MONO
MAIN/SAP
IN SEL 1
IN SEL 2
PAL
VIDEO OUT
GVD
COMP SYNC
A-MUTE
NT 3.58
LP.EP
VSDATA(SSB)
VCLK(SSB)
REC P
FULL ERASE
PICT_CONT
RF ENV
RF SWP
SCK1(SSB)
SDI(SSB)
AF REC
AF REC P
AF ENV
AF SWP
DATA(IIC)
CLOCK(IIC)
PCONT
D5V
R5V
ANGND
SW5V
DGND
CAP_RVS
CAP_QR
S_REEL
T_REEL
MODE4
MODE3
MODE2
MODE1
CAM
END_LED
CAP_PWM
DRUM_QR
REC PRF
CAP_FG
DRUM_PG
DRUM_FG
DRUM_VS
CAP_VS
T_SENS
S_SENS
D_GND
DMS_DOWN
KEY1
KEY2
DMS_UP
REMOCOM
AN_GND
D_GND
UNSW_5V
S_IN
S_CLK
S_OUT
FL CS
UNSW_5V
DGND
VID OUT
VID OUT2
ED4/ED7/ED8
ED1

no mark:REC/PB mode
R:REC mode
P:PB mode
*:Impossible to measure the voltage at the marked points.

• SIGNAL PATH

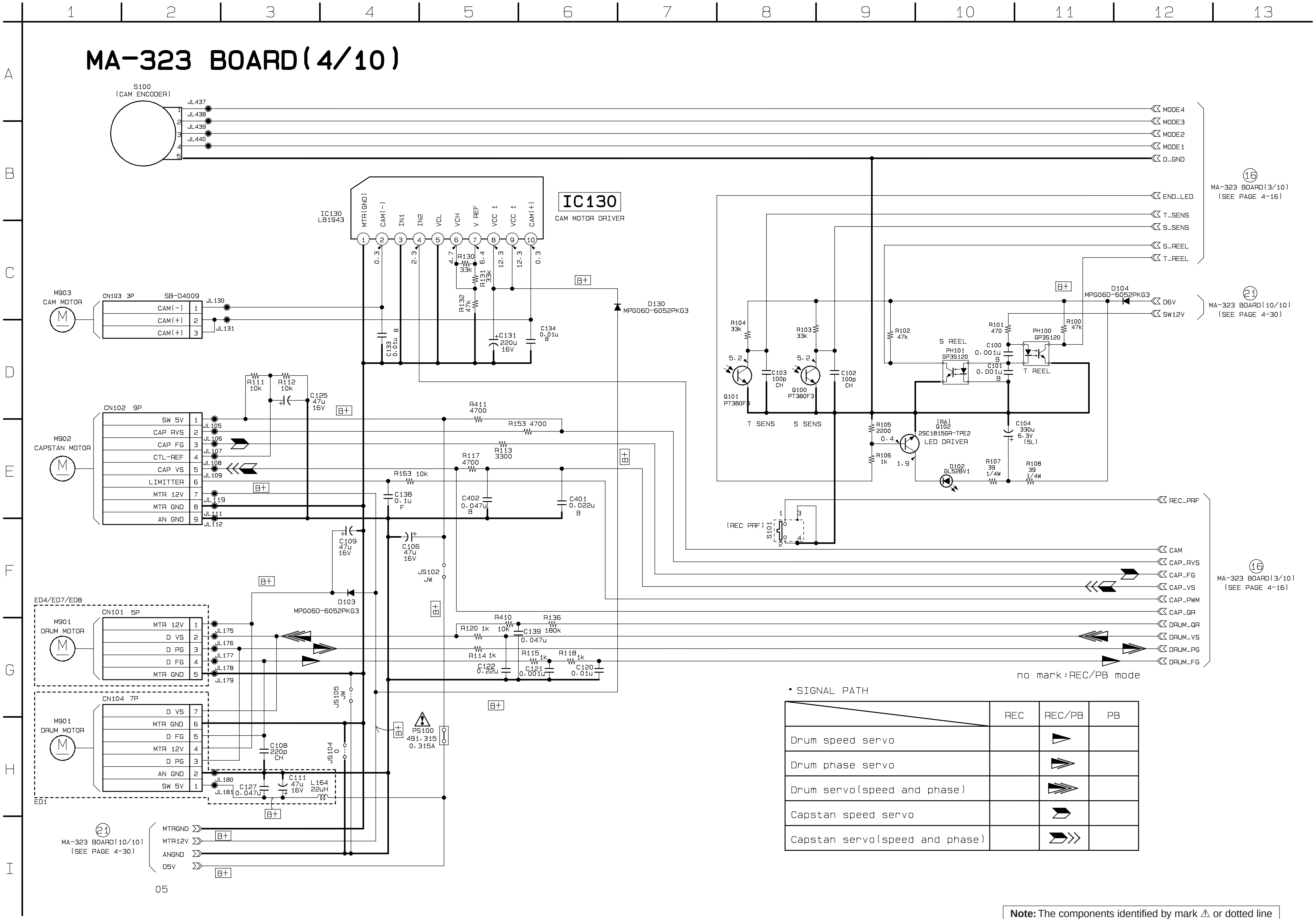
	VIDEO SIGNAL
	Y/CHROMA
REC	➡≫
PB	⇨≫

• SIGNAL PATH

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		⇛	
Drum servo(speed and phase)		⋙	
Capstan speed servo		➧	
Capstan servo(speed and phase)		➧≫	
Ref.signal	➤		▷

MA-323 (SERVO CONTROL) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.

– Ref. No.: MA-323 board; 2,000 series –



1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I
MA-323 BOARD(4/10)
S100 (CAM ENCODER)
JL437 JL438 JL439 JL440
MODE4
MODE3
MODE2
MODE1
D_GND
IC130 LB1943
IC130
CAM MOTOR DRIVER
MTR(GND) CAM(-) IN1 IN2 VCL VCH V REF VCC 1 VCC 1 CAM(+)
0.3 2.3 4.7 6.4 12.3 12.3 0.3
R130 33k
R131 33k
R132 47k
C131 220u 16V
C134 0.01u B
C133 0.01u B
M903 CAM MOTOR
CN103 3P SB-D4009
CAM(-) CAM(+) CAM(+)
JL130 JL131
D130 MPG06D-6052PKG3
B+
M902 CAPSTAN MOTOR
CN102 9P
SW 5V
CAP RVS
CAP FG
CTL-REF
CAP VS
LIMITTER
MTR 12V
MTR GND
AN GND
JL105 JL106 JL107 JL108 JL109 JL119 JL111 JL112
R111 10k
R112 10k
C125 47u 16V
R411 4700
R153 4700
R113 3300
R117 4700
R163 10k
C138 0.1u F
C402 0.047u B
C401 0.022u B
C109 47u 16V
C106 47u 16V
JS102 JW
D103 MPG06D-6052PKG3
ED4/ED7/ED8
M901 DRUM MOTOR
CN101 5P
MTR 12V
D VS
D PG
D FG
MTR GND
JL175 JL176 JL177 JL178 JL179
R410 10k
R136 180k
R120 1k
C139 0.047u
R114 1k
R115 1k
R118 1k
C122 0.22u
C121 0.001u
C120 0.01u
CN104 7P
D VS
MTR GND
D FG
MTR 12V
D PG
AN GND
SW 5V
JL180 JL181
C108 220p CH
C127 0.047u
C111 47u 16V
L164 22uH
JS105 JW
JS104 0
PS100 491.315 0.315A
ED1
21
MA-323 BOARD(10/10) (SEE PAGE 4-30)
MTRGND
MTR12V
ANGND
D5V
05
END_LED
T_SENS
S_SENS
S_REEL
T_REEL
16
MA-323 BOARD(3/10) (SEE PAGE 4-16)
D104 MPG06D-6052PKG3
D6V
SW12V
21
MA-323 BOARD(10/10) (SEE PAGE 4-30)
R104 33k
R103 33k
R102 47k
R101 470
R100 47k
PH100 GP3S120
S REEL
PH101 GP3S120
C100 0.001u B
C101 0.001u B
T REEL
5.2 5.2
C103 100p CH
C102 100p CH
Q101 PT380F3
Q100 PT380F3
T SENS
S SENS
R105 2200
0.4
(RA) Q102 2SC1815GR-TPE2 LED DRIVER
R106 1k
1.9
C104 330u 6.3V (5L)
D102 GL528V1
R107 39 1/4W
R108 39 1/4W
(REC PRF)
S101
REC_PRF
CAM
CAP_RVS
CAP_FG
CAP_VS
CAP_PWM
CAP_QR
DRUM_QR
DRUM_VS
DRUM_PG
DRUM_FG
16
MA-323 BOARD(3/10) (SEE PAGE 4-16)
no mark:REC/PB mode

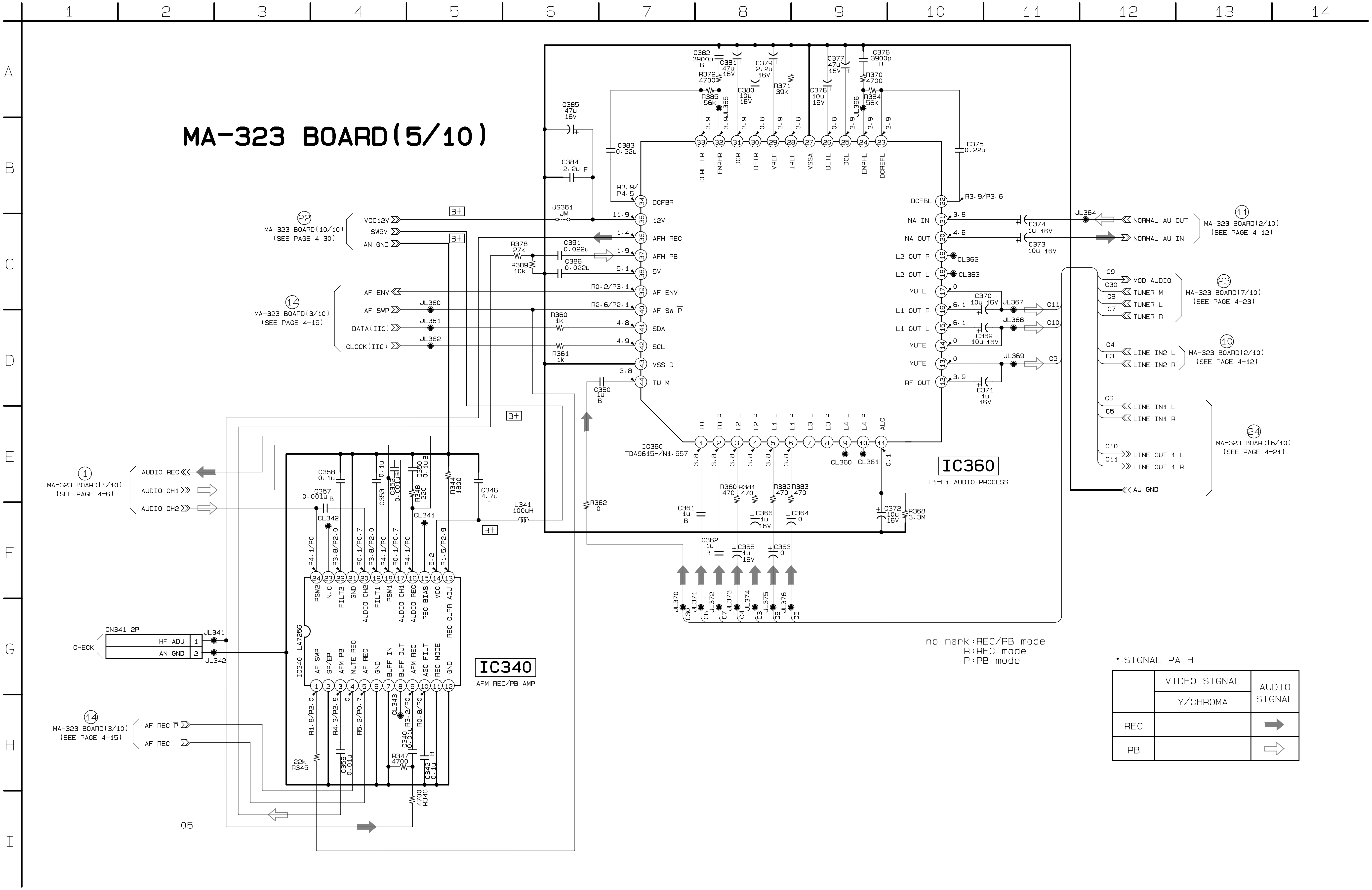
• SIGNAL PATH

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		⇨	
Drum servo(speed and phase)		⋙	
Capstan speed servo		➤	
Capstan servo(speed and phase)		➤»	

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

MA-323 (Hi-Fi AUDIO) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.
– Ref. No.: MA-323 board; 2,000 series –

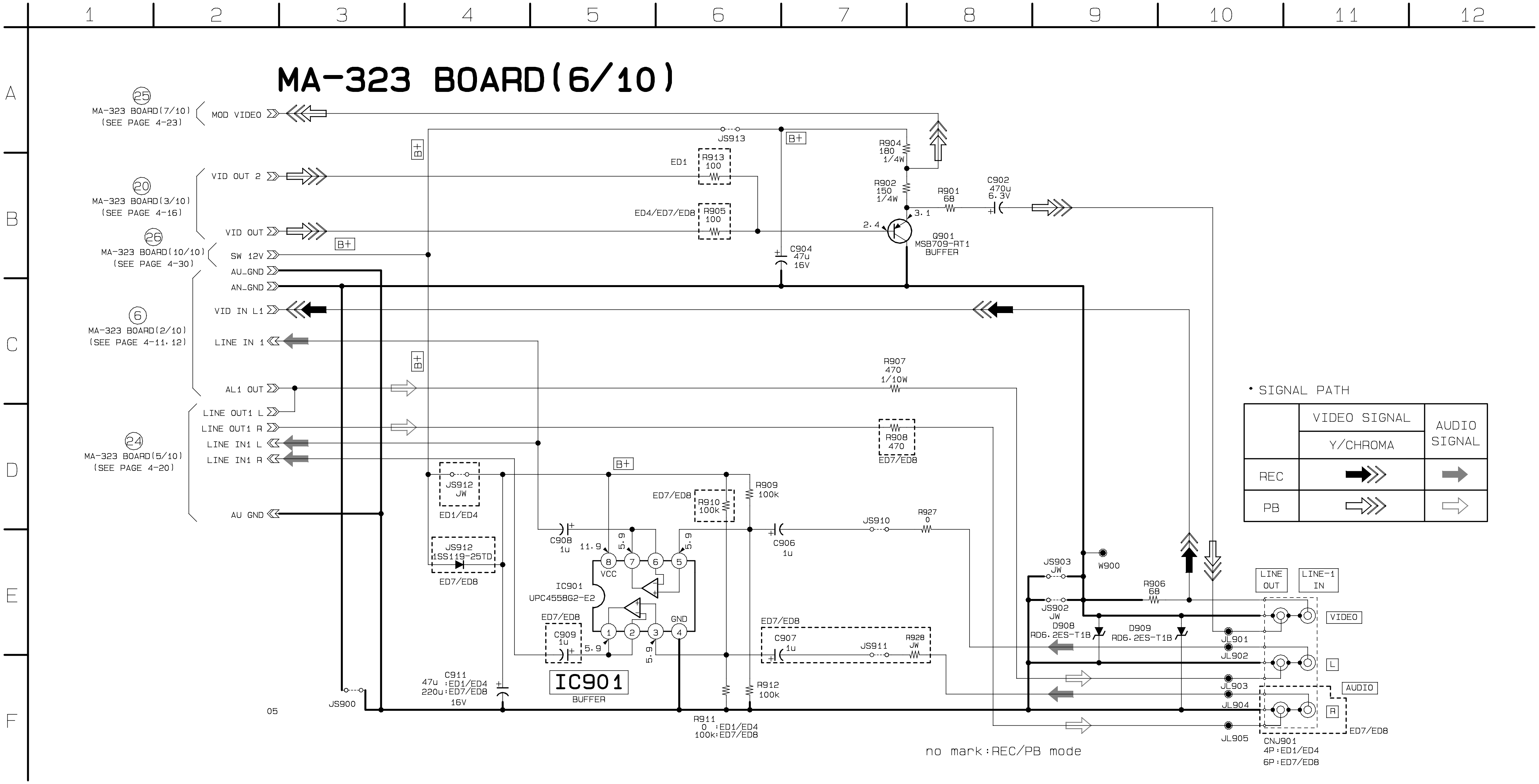
– SLV-ED7/ED8 –


MA-323 BOARD(5/10)
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I
IC360 TDA9615H/N1.557
IC360 Hi-Fi AUDIO PROCESS
IC340 LA7256
IC340 AFM REC/PB AMP
DCFBR
12V
AFM REC
AFM PB
5V
AF ENV
AF SW P
SDA
SCL
VSS D
TU M
DCREFR EMPHR DCR DETR VREF IREF VSSA DETL DCL EMPHL DCREFL
DCFBL
NA IN
NA OUT
L2 OUT R
L2 OUT L
MUTE
L1 OUT R
L1 OUT L
MUTE
MUTE
RF OUT
TU L TU R L2 L L2 R L1 L L1 R L3 L L3 R L4 L L4 R ALC
PSW2 N.C FILT2 GND AUDIO CH2 FILT1 PSW1 AUDIO CH1 AUDIO REC REC BIAS VCC REC CURR ADJ
AF SWP SP/EP AFM PB MUTE REC AF REC GND BUFF IN BUFF OUT AFM REC AGC FILT REC MODE GND
22 MA-323 BOARD(10/10) (SEE PAGE 4-30)
VCC12V
SW5V
AN GND
14 MA-323 BOARD(3/10) (SEE PAGE 4-15)
AF ENV
AF SWP
DATA(IIC)
CLOCK(IIC)
1 MA-323 BOARD(1/10) (SEE PAGE 4-6)
AUDIO REC
AUDIO CH1
AUDIO CH2
CN341 2P
CHECK
HF ADJ
AN GND
14 MA-323 BOARD(3/10) (SEE PAGE 4-15)
AF REC P
AF REC
11 MA-323 BOARD(2/10) (SEE PAGE 4-12)
NORMAL AU OUT
NORMAL AU IN
23 MA-323 BOARD(7/10) (SEE PAGE 4-23)
MOD AUDIO
TUNER M
TUNER L
TUNER R
10 MA-323 BOARD(2/10) (SEE PAGE 4-12)
LINE IN2 L
LINE IN2 R
24 MA-323 BOARD(6/10) (SEE PAGE 4-21)
LINE IN1 L
LINE IN1 R
LINE OUT 1 L
LINE OUT 1 R
AU GND
C382 3900p B
C381 47u 16V
C379 2.2u 16V
C377 47u 16V
C376 3900p B
R372 4700
R371 39k
R370 4700
R385 56k
C380 10u 16V
C378 10u 16V
R384 56k
JL365
JL366
C385 47u 16V
C383 0.22u
C384 2.2u F
C375 0.22u
JS361 JW
C391 0.022u
C386 0.022u
R378 27k
R389 10k
R360 1k
R361 1k
C360 1u B
C374 1u 16V
C373 10u 16V
C370 10u 16V
C369 10u 16V
C371 1u 16V
JL364
JL367
JL368
JL369
CL362
CL363
CL360
CL361
JL360
JL361
JL362
R380 470
R381 470
R382 470
R383 470
C361 1u B
C366 1u 16V
C364 0
C372 10u 16V
R368 3.3M
C362 1u B
C365 1u 16V
C363 0
R362 0
JL370 JL371 JL372 JL373 JL374 JL375 JL376
C358 0.1u
C357 0.001u B
CL342
C353 0.1u
C352 0.001u B
R348 220
C350 0.1u B
R344 1800
C346 4.7u F
CL341
L341 100uH
JL341
JL342
CL343
C340 0.01u
R347 4700
C342 0.1u B
R345 22k
C359 0.01u
R346 4700
B+
05
no mark:REC/PB mode
R:REC mode
P:PB mode
• SIGNAL PATH
VIDEO SIGNAL
Y/CHROMA
AUDIO SIGNAL
REC
PB

Hi-Fi AUDIO
MA-323 (5/10)

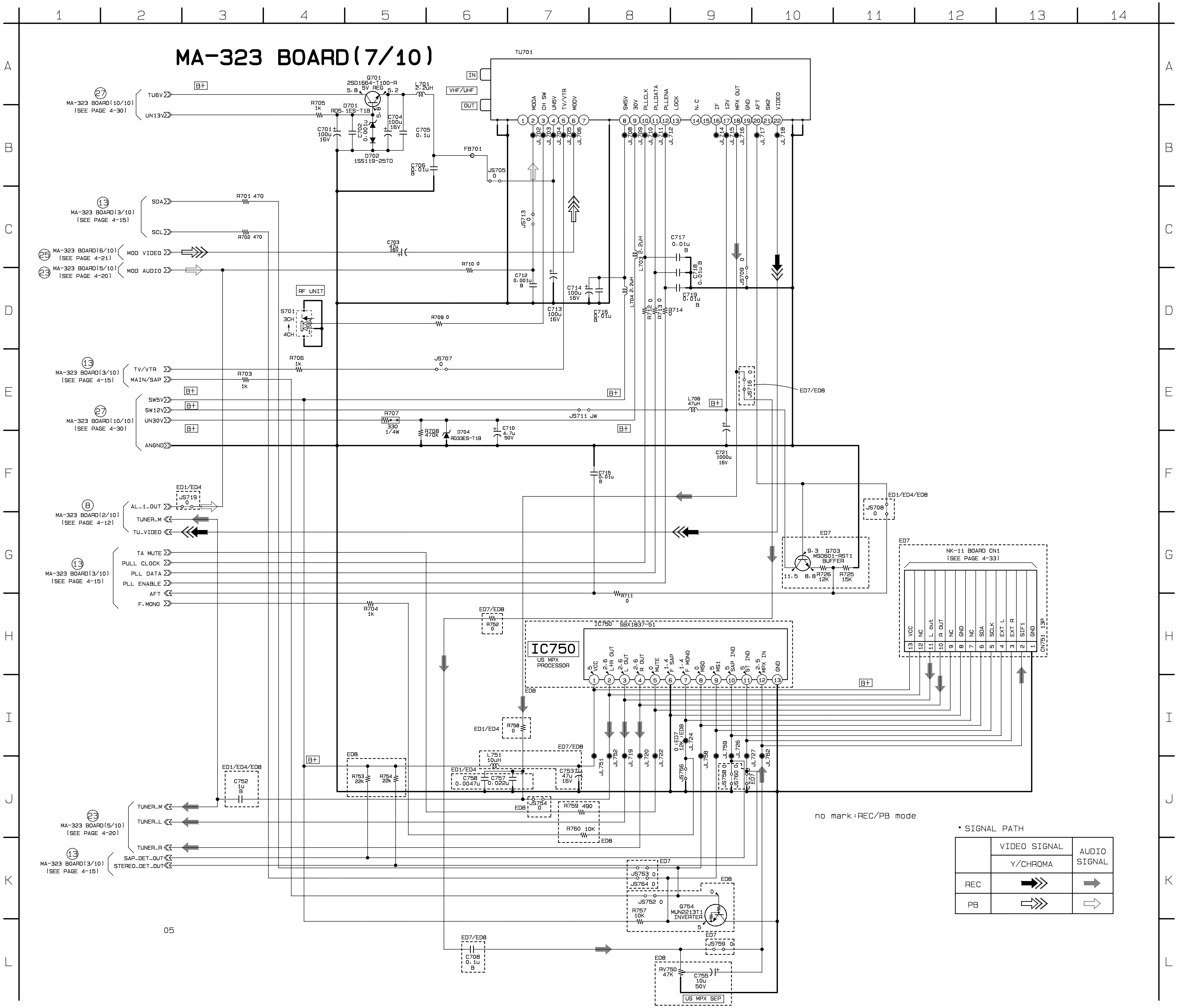
MA-323 (IO) SCHEMATIC DIAGRAM **• See page 4-9 to 4-10 for printed wiring board.**

– Ref. No.: MA-323 board; 2,000 series –


MA-323 BOARD(6/10)
1 2 3 4 5 6 7 8 9 10 11 12
A B C D E F
㉕ MA-323 BOARD(7/10) (SEE PAGE 4-23)
MOD VIDEO
⑳ MA-323 BOARD(3/10) (SEE PAGE 4-16)
VID OUT 2
VID OUT
㉖ MA-323 BOARD(10/10) (SEE PAGE 4-30)
SW 12V
AU_GND
AN_GND
⑥ MA-323 BOARD(2/10) (SEE PAGE 4-11, 12)
VID IN L1
LINE IN 1
AL1 OUT
㉔ MA-323 BOARD(5/10) (SEE PAGE 4-20)
LINE OUT1 L
LINE OUT1 R
LINE IN1 L
LINE IN1 R
AU GND
B+
JS913
ED1
R913 100
ED4/ED7/ED8
R905 100
R904 180 1/4W
R902 150 1/4W
R901 68
C902 470u 6.3V
C904 47u 16V
2.4
3.1
Q901 MSB709-RT1 BUFFER
R907 470 1/10W
R908 470
ED7/ED8
JS912 JW
ED1/ED4
JS912 1SS119-25TD
ED7/ED8
C908 1u
11.9
5.9
5.9
VCC
IC901 UPC4558G2-E2
ED7/ED8
C909 1u
5.9
5.9
GND
IC901 BUFFER
R910 100k
ED7/ED8
R909 100k
C906 1u
JS910
R927 0
ED7/ED8
C907 1u
JS911
R928 JW
R912 100k
R911 0 :ED1/ED4 100k:ED7/ED8
C911 47u :ED1/ED4 220u:ED7/ED8 16V
JS900
05
JS903 JW
W900
JS902 JW
D908 RD6.2ES-T1B
D909 RD6.2ES-T1B
R906 68
JL901
JL902
JL903
JL904
JL905
LINE OUT
LINE-1 IN
VIDEO
L
AUDIO
R
ED7/ED8
CNJ901 4P:ED1/ED4 6P:ED7/ED8
no mark:REC/PB mode
• SIGNAL PATH
VIDEO SIGNAL
Y/CHROMA
AUDIO SIGNAL
REC
PB

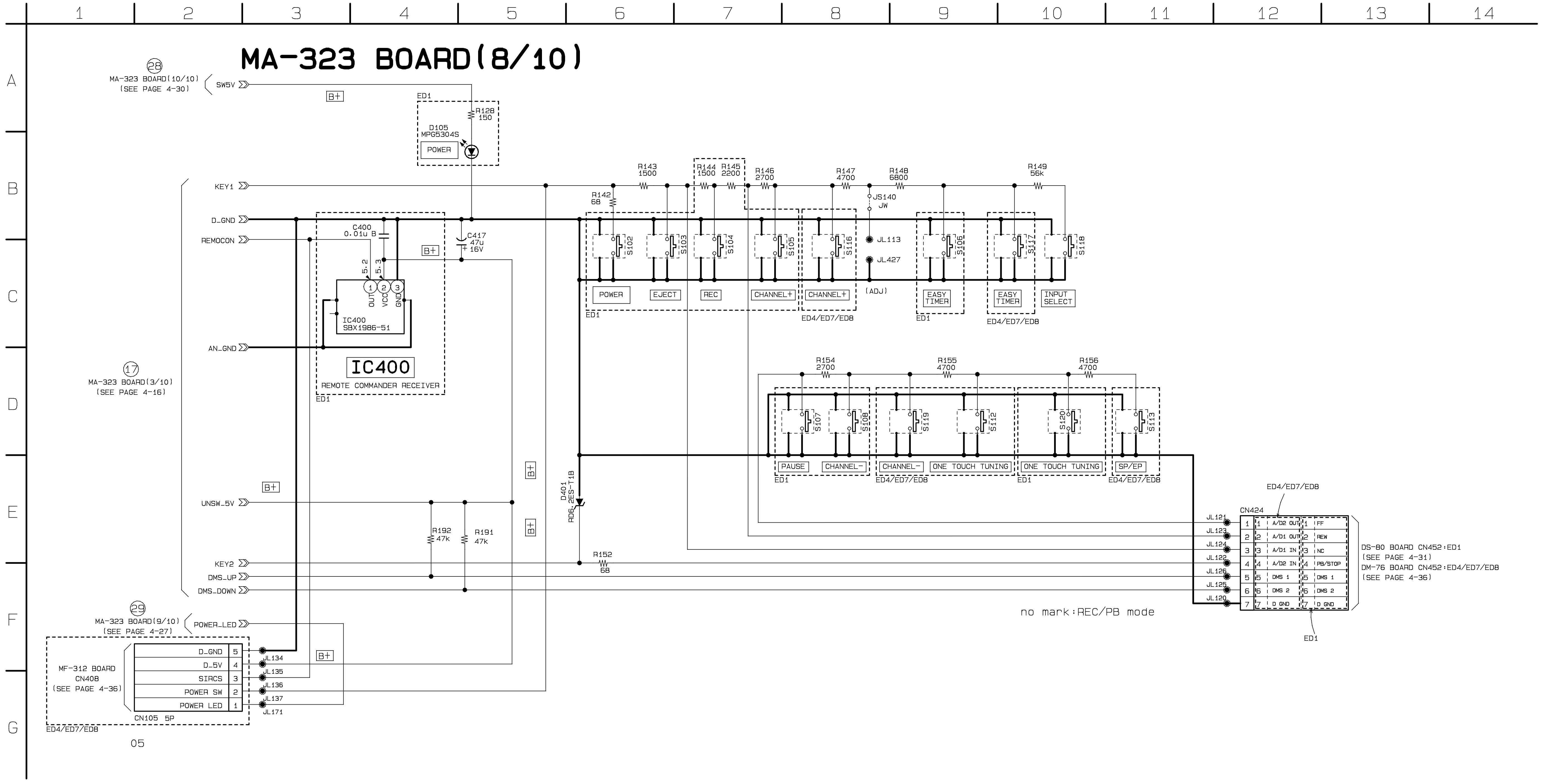
MA-323 (TUNER) SCHEMATIC DIAGRAM **• See page 4-9 to 4-10 for printed wiring board.**

– Ref. No.: MA-323 board; 2,000 series –


MA-323 BOARD(7/10)
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I J K L
TU701
IN
VHF/UHF
OUT
MODA
CH SW
UN5V
TV/VTR
MODV
SW5V
30V
PLLCLK
PLLDATA
PLLENA
LOCK
N.C
IF
12V
MPX OUT
GND
AFT
SW2
VIDEO
Q701 2SD1664-T100-R 5V REG
L701 2.2uH
R705 1k
D701 RD5.1ES-T1B
C701 100u 16V
C702 0.001u
C704 100u 16V
C705 0.1u
D702 1SS119-25TD
C706 0.01u B
FB701
JS705 0
27 MA-323 BOARD(10/10) (SEE PAGE 4-30)
TU6V
UN13V
13 MA-323 BOARD(3/10) (SEE PAGE 4-15)
SDA
SCL
R701 470
R702 470
25 MA-323 BOARD(6/10) (SEE PAGE 4-21)
MOD VIDEO
23 MA-323 BOARD(5/10) (SEE PAGE 4-20)
MOD AUDIO
C703 47u 16V
R710 0
C712 0.001u B
JS713 0
C714 100u 16V
C713 100u 16V
C716 0.01u B
L703 2.2uH
L704 2.2uH
C717 0.01u B
C718 0.01u B
C719 0.01u B
R712 0
R713 0
R714
JS709 0
RF UNIT
S701 3CH 4CH
R709 0
R706 1k
JS707 0
TV/VTR
MAIN/SAP
R703 1k
JS716 0
ED7/ED8
SW5V
SW12V
UN30V
ANGND
R707 330 1/4W
R708 470K
D704 RD33ES-T1B
C710 4.7u 50V
JS711 JW
L706 47uH
C721 1000u 16V
C715 0.01u B
B+
ED1/ED4
JS719 0
8 MA-323 BOARD(2/10) (SEE PAGE 4-12)
AL_1_OUT
TUNER_M
TU_VIDEO
ED1/ED4/ED8
JS708 0
ED7
Q703 MSD601-RST1 BUFFER
R726 12K
R725 15K
TA MUTE
PULL CLOCK
PLL DATA
PLL ENABLE
AFT
F.MONO
R711 0
R704 1k
NK-11 BOARD CN1 (SEE PAGE 4-33)
13 VCC
12 NC
11 L out
10 R OUT
9 NC
8 GND
7 NC
6 SDA
5 SCLK
4 EXT L
3 EXT R
2 SIF1
1 GND
CN751 13P
ED7/ED8
R752 0
IC750 SBX1637-51
IC750 US MPX PROCESSOR
VCC
L+R OUT
L OUT
R OUT
MUTE
F SAP
F MONO
MSO
MS1
SAP IND
ST IND
MPX IN
GND
ED8
ED1/ED4
R758 0
ED7/ED8
L751 10uH
C758 0.0047u
C757 0.022u
C753 47u 16V
JS754 0
R759 490
R760 10K
R753 22k
R754 22k
C752 1u B
TUNER_M
TUNER_L
TUNER_R
SAP_DET_OUT
STEREO_DET_OUT
JL751 JL752 JL719 JL720 JL722 JL724 JL758 JL759 JL726 JL727 JL762
JS756
JS758 0
JS760 0
JS763 0
JS764 0
JS752 0
Q754 MUN2213T1 INVERTER
R757 10K
JS759 0
C708 0.1u B
RV750 47K
C755 10u 50V
US MPX SEP
05
no mark:REC/PB mode
• SIGNAL PATH
VIDEO SIGNAL
Y/CHROMA
AUDIO SIGNAL
REC
PB

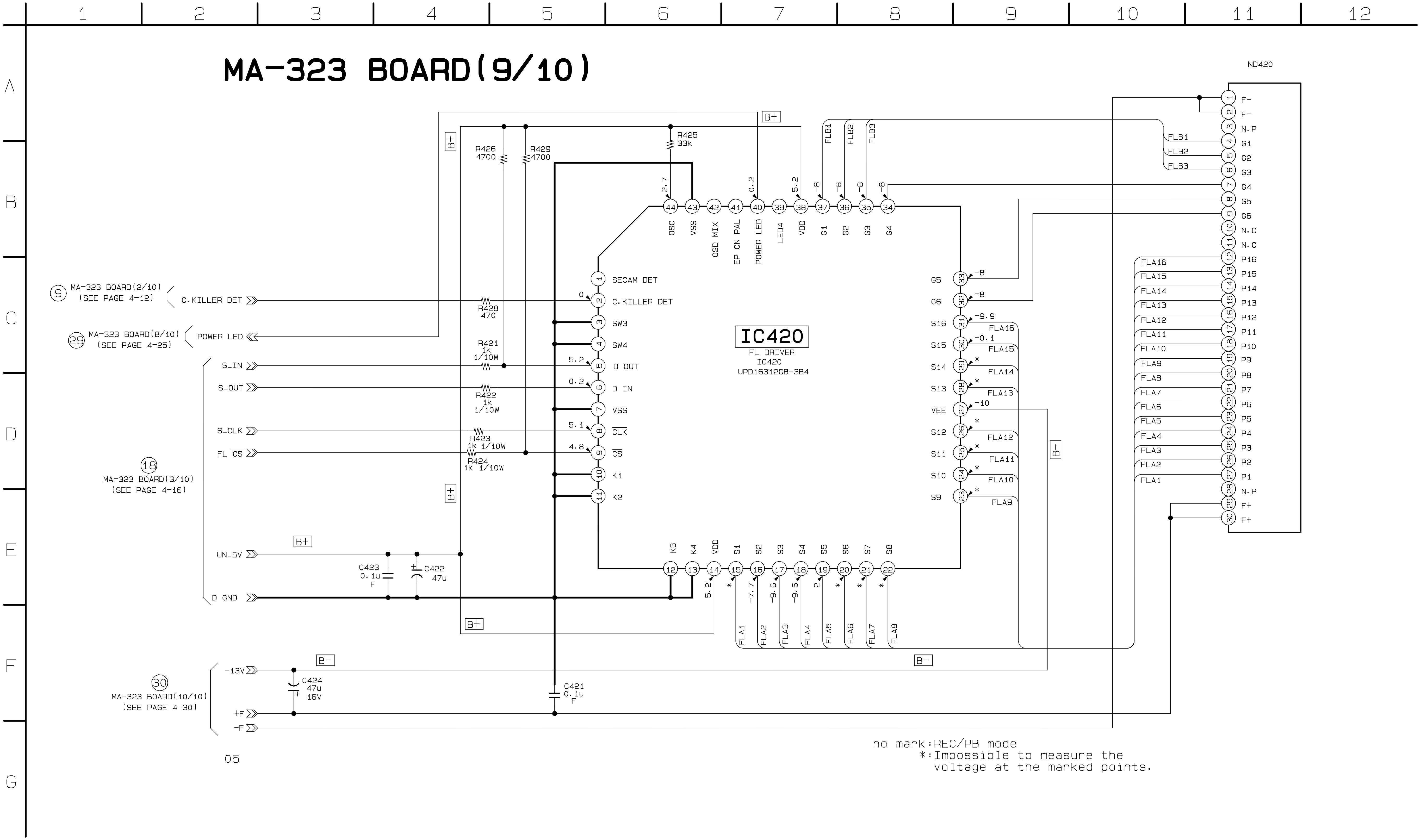
MA-323 (MODE CONTROL) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.

– Ref. No.: MA-323 board; 2,000 series –


1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G
MA-323 BOARD(8/10)
㉘ MA-323 BOARD(10/10) (SEE PAGE 4-30)
SW5V
B+
ED1
R128 150
D105 MPG5304S
POWER
KEY1
D_GND
REMOCON
AN_GND
C400 0.01u B
C417 47u 16V
5.2
5.3
OUT VCC GND
IC400 SBX1986-51
IC400
REMOTE COMMANDER RECEIVER
⑰ MA-323 BOARD(3/10) (SEE PAGE 4-16)
R143 1500
R144 1500
R145 2200
R146 2700
R147 4700
R148 6800
R149 56k
R142 68
JS140 JW
JL113
JL427
(ADJ)
S102 S103 S104 S105 S116 S106 S117 S118
POWER
EJECT
REC
CHANNEL+
CHANNEL+
EASY TIMER
EASY TIMER
INPUT SELECT
ED1
ED4/ED7/ED8
ED1
ED4/ED7/ED8
R154 2700
R155 4700
R156 4700
S107 S108 S119 S112 S120 S113
PAUSE
CHANNEL−
CHANNEL−
ONE TOUCH TUNING
ONE TOUCH TUNING
SP/EP
ED1
ED4/ED7/ED8
ED1
ED4/ED7/ED8
D401 RD6.2ES-T1B
UNSW_5V
R192 47k
R191 47k
KEY2
DMS_UP
DMS_DOWN
R152 68
ED4/ED7/ED8
CN424
JL121 JL123 JL124 JL122 JL126 JL125 JL120
1 A/D2 OUT 1 FF
2 A/D1 OUT 2 REW
3 A/D1 IN 3 NC
4 A/D2 IN 4 PB/STOP
5 DMS 1 5 DMS 1
6 DMS 2 6 DMS 2
7 D GND 7 D GND
ED1
DS-80 BOARD CN452:ED1 (SEE PAGE 4-31)
DM-76 BOARD CN452:ED4/ED7/ED8 (SEE PAGE 4-36)
no mark:REC/PB mode
㉙ MA-323 BOARD(9/10) (SEE PAGE 4-27)
POWER_LED
MF-312 BOARD CN408 (SEE PAGE 4-36)
D_GND 5
D_5V 4
SIRCS 3
POWER SW 2
POWER LED 1
JL134 JL135 JL136 JL137 JL171
CN105 5P
ED4/ED7/ED8
05

MA-323 (FL DRIVER) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.

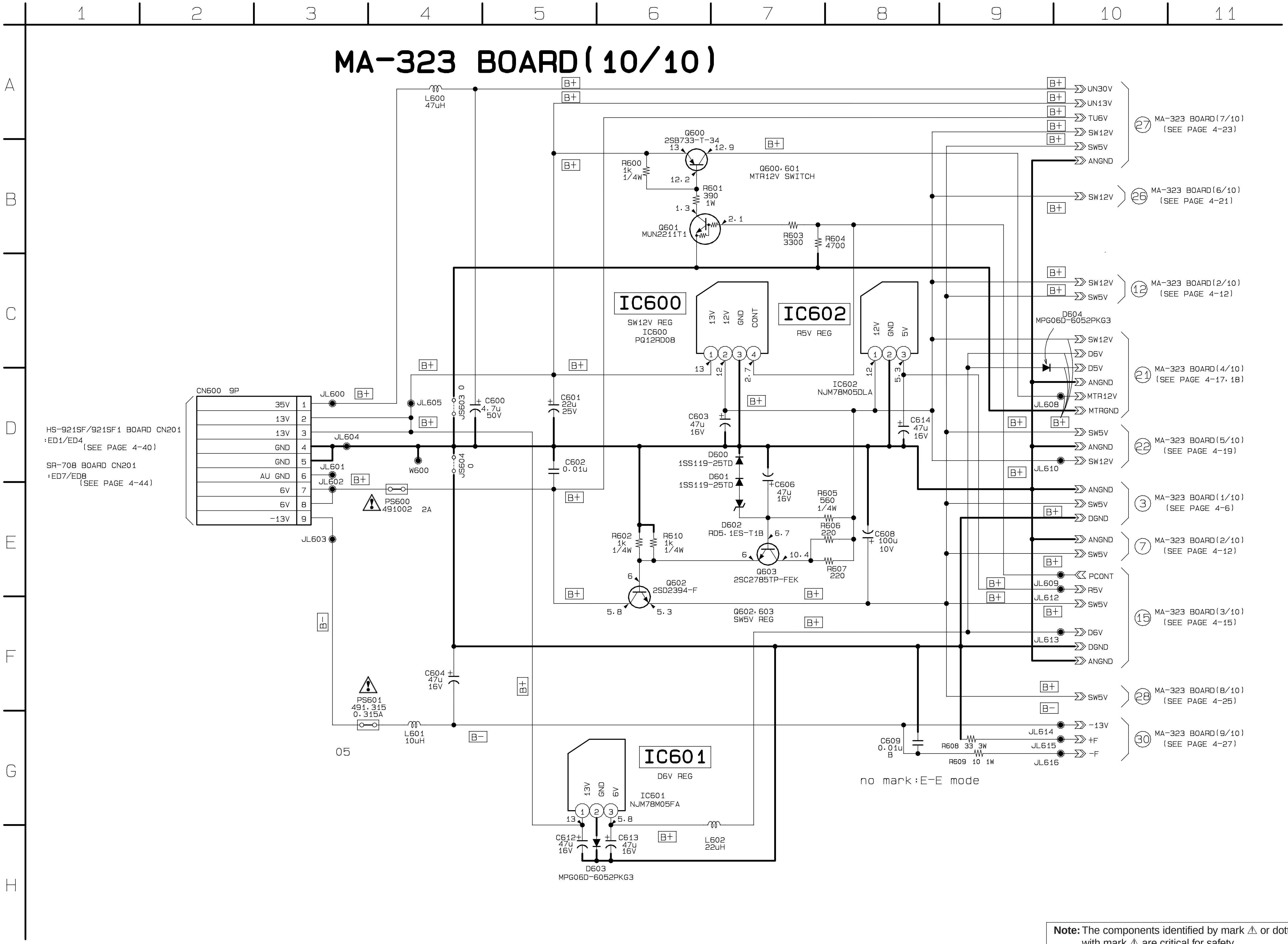
– Ref. No.: MA-323 board; 2,000 series –


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
MA-323 BOARD(9/10)
ND420
B+
B-
R426 4700
R429 4700
R425 33k
R428 470
R421 1k 1/10W
R422 1k 1/10W
R423 1k 1/10W
R424 1k 1/10W
C423 0.1u F
C422 47u
C424 47u 16V
C421 0.1u F
IC420
FL DRIVER
IC420
UPD16312GB-3B4
SECAM DET
C.KILLER DET
SW3
SW4
D OUT
D IN
VSS
CLK
CS
K1
K2
K3
K4
VDD
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
VEE
S13
S14
S15
S16
G6
G5
G4
G3
G2
G1
VDD
LED4
POWER LED
EP ON PAL
OSD MIX
VSS
OSC
⑨ MA-323 BOARD(2/10) (SEE PAGE 4-12)
C.KILLER DET
㉙ MA-323 BOARD(8/10) (SEE PAGE 4-25)
POWER LED
S_IN
S_OUT
S_CLK
FL CS
⑱ MA-323 BOARD(3/10) (SEE PAGE 4-16)
UN_5V
D GND
-13V
+F
-F
㉚ MA-323 BOARD(10/10) (SEE PAGE 4-30)
F-
F-
N.P
G1
G2
G3
G4
G5
G6
N.C
N.C
P16
P15
P14
P13
P12
P11
P10
P9
P8
P7
P6
P5
P4
P3
P2
P1
N.P
F+
F+
FLB1
FLB2
FLB3
FLA1
FLA2
FLA3
FLA4
FLA5
FLA6
FLA7
FLA8
FLA9
FLA10
FLA11
FLA12
FLA13
FLA14
FLA15
FLA16
2.7
0.2
5.2
-8
0
5.2
0.2
5.1
4.8
-9.9
-0.1
-10
5.2
-7.7
-9.6
2
05

no mark:REC/PB mode
*:Impossible to measure the voltage at the marked points.

MA-323 (POWER SUPPLY) SCHEMATIC DIAGRAM • See page 4-9 to 4-10 for printed wiring board.

– Ref. No.: MA-323 board; 2,000 series –

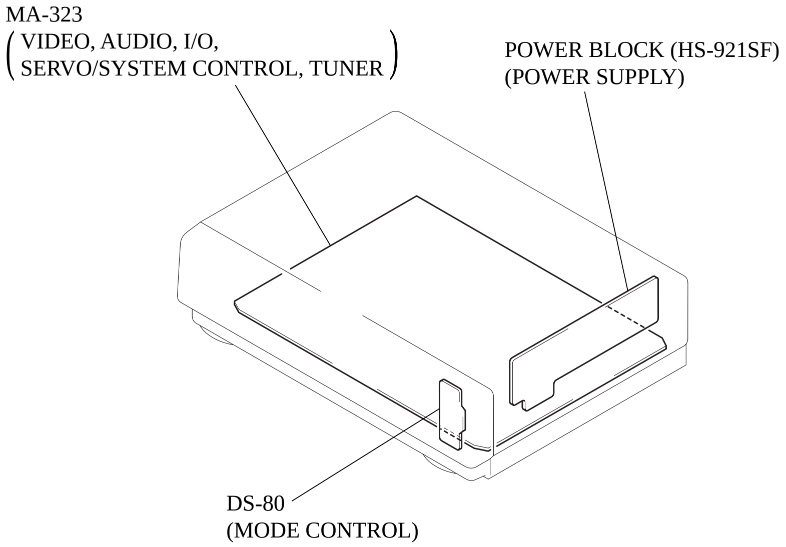

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
MA-323 BOARD(10/10)
L600
47uH
Q600
2SB733-T-34
13
12.9
R600
1k
1/4W
12.2
R601
390
1W
1.3
Q601
MUN2211T1
2.1
R603
3300
R604
4700
Q600,601
MTR12V SWITCH
IC600
SW12V REG
IC600
PQ12RD08
13V
12V
GND
CONT
IC602
R5V REG
12V
GND
5V
IC602
NJM78M05DLA
D604
MPG06D-6052PKG3
CN600 9P
35V
13V
13V
GND
GND
AU GND
6V
6V
-13V
HS-921SF/921SF1 BOARD CN201
:ED1/ED4
(SEE PAGE 4-40)
SR-708 BOARD CN201
:ED7/ED8
(SEE PAGE 4-44)
JL600
JL605
JL604
JL601
JL602
JL603
W600
JS603 0
JS604 0
C600
4.7u
50V
C601
22u
25V
C602
0.01u
PS600
491002 2A
C603
47u
16V
D600
1SS119-25TD
D601
1SS119-25TD
D602
RD5.1ES-T1B
C606
47u
16V
R605
560
1/4W
R606
220
R607
220
C608
100u
10V
C614
47u
16V
R602
1k
1/4W
R610
1k
1/4W
Q603
2SC2785TP-FEK
6.7
10.4
Q602
2SD2394-F
5.8
5.3
Q602,603
SW5V REG
C604
47u
16V
PS601
491.315
0.315A
L601
10uH
05
IC601
D6V REG
IC601
NJM78M05FA
C612
47u
16V
C613
47u
16V
D603
MPG06D-6052PKG3
L602
22uH
C609
0.01u
B
R608 33 3W
R609 10 1W
no mark:E-E mode
B+
B-
UN30V
UN13V
TU6V
SW12V
SW5V
ANGND
MA-323 BOARD(7/10)
(SEE PAGE 4-23)
MA-323 BOARD(6/10)
(SEE PAGE 4-21)
MA-323 BOARD(2/10)
(SEE PAGE 4-12)
D6V
D5V
MTR12V
MTRGND
JL608
MA-323 BOARD(4/10)
(SEE PAGE 4-17,18)
JL610
MA-323 BOARD(5/10)
(SEE PAGE 4-19)
DGND
MA-323 BOARD(1/10)
(SEE PAGE 4-6)
MA-323 BOARD(2/10)
(SEE PAGE 4-12)
PCONT
R5V
JL609
JL612
JL613
MA-323 BOARD(3/10)
(SEE PAGE 4-15)
MA-323 BOARD(8/10)
(SEE PAGE 4-25)
-13V
+F
-F
JL614
JL615
JL616
MA-323 BOARD(9/10)
(SEE PAGE 4-27)
㉗
㉖
⑫
㉑
㉒
③
⑦
⑮
㉘
㉚

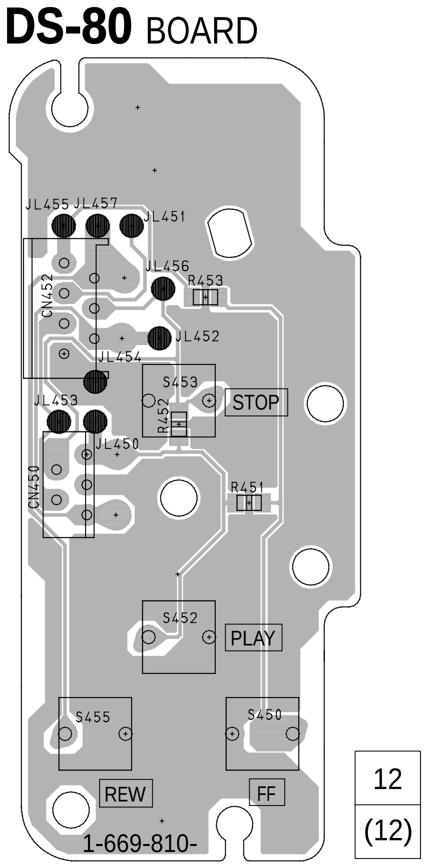
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

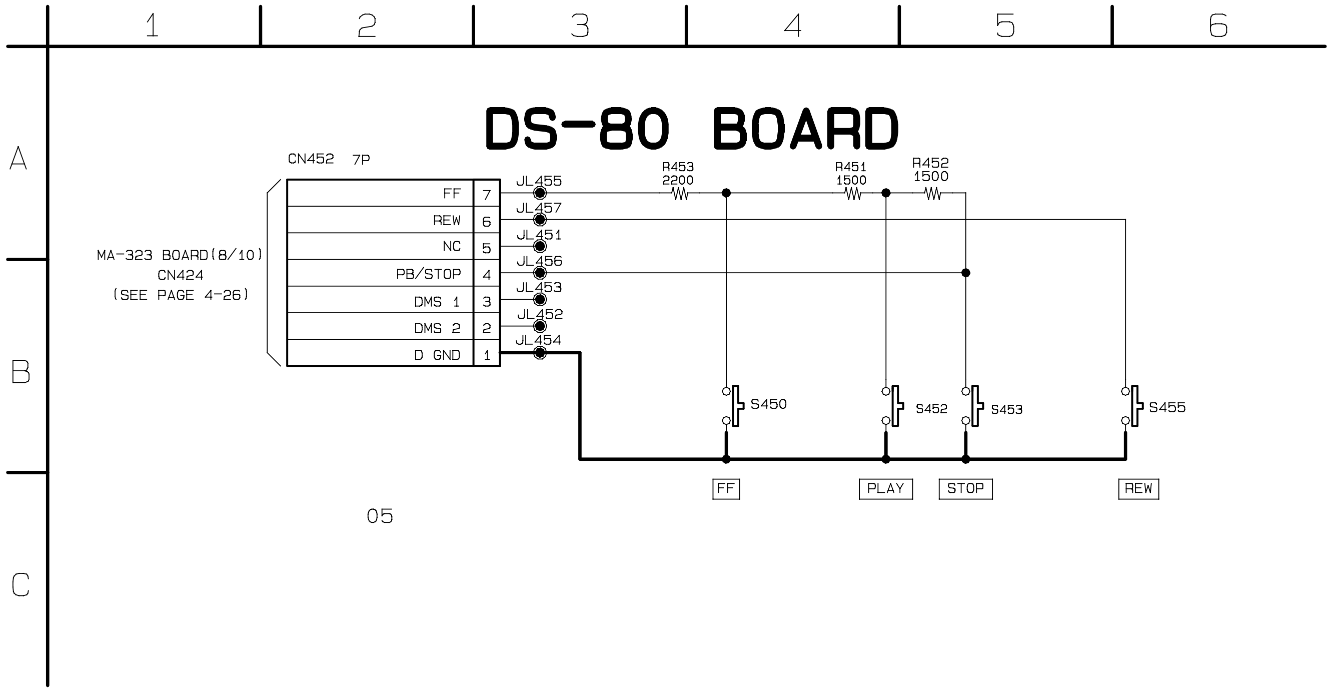
DS-80 (MODE CONTROL) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

– Ref. No.: DS-80 board; 2,000 series –

– SLV-ED1 –


MA-323
(VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER)
POWER BLOCK (HS-921SF)
(POWER SUPPLY)
DS-80
(MODE CONTROL)


DS-80 BOARD
JL455
JL457
JL451
JL456
R453
CN452
JL452
JL454
S453
STOP
JL453
R452
JL450
CN450
R451
S452
PLAY
S455
S450
REW
FF
1-669-810-
12
(12)

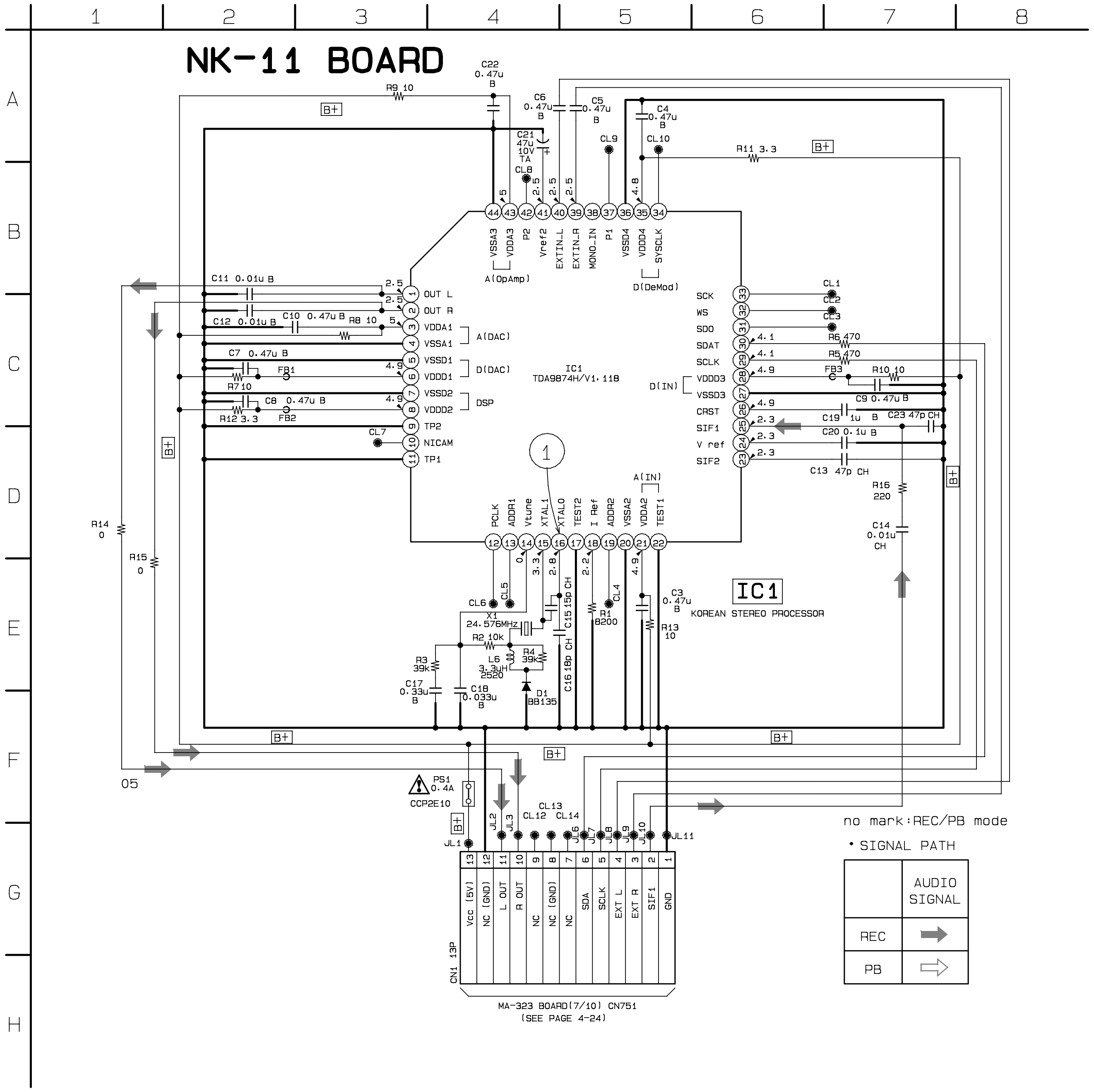

1
2
3
4
5
6
A
B
C
DS-80 BOARD
CN452 7P
MA-323 BOARD(8/10)
CN424
(SEE PAGE 4-26)
FF 7
REW 6
NC 5
PB/STOP 4
DMS 1 3
DMS 2 2
D GND 1
JL455
JL457
JL451
JL456
JL453
JL452
JL454
R453
2200
R451
1500
R452
1500
S450
S452
S453
S455
FF
PLAY
STOP
REW
05

NK-11 (KOREAN STEREO) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

– Ref. No.: NK-11 board; 1,000 series –

– SLV-ED7 –

There are few cases that the part isn't mounted in this model is printed on this diagram.

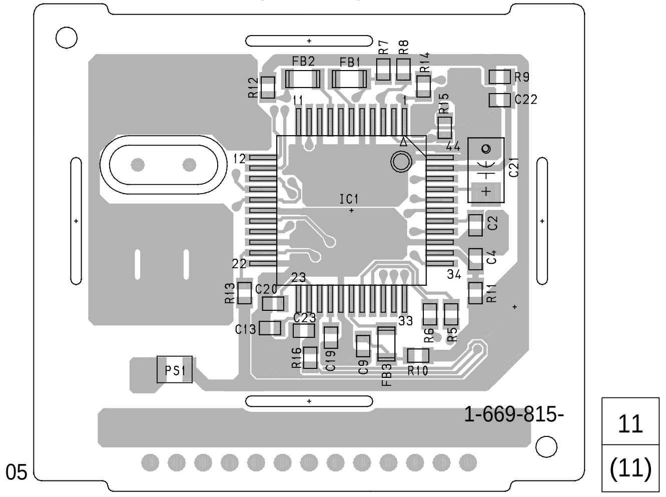

1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
NK-11 BOARD
IC1
TDA9874H/V1.11B
KOREAN STEREO PROCESSOR
A(OpAmp)
D(DeMod)
A(DAC)
D(DAC)
DSP
D(IN)
A(IN)
OUT L
OUT R
VDDA1
VSSA1
VSSD1
VDDD1
VSSD2
VDDD2
TP2
NICAM
TP1
SCK
WS
SDO
SDAT
SCLK
VDDD3
VSSD3
CRST
SIF1
V ref
SIF2
PCLK
ADDR1
Vtune
XTAL1
XTAL0
TEST2
I ref
ADDR2
VSSA2
VDDA2
TEST1
VSSA3
VDDA3
P2
Vref2
EXTIN_L
EXTIN_R
MONO_IN
P1
VSSD4
VDDD4
SYSCLK
C22 0.47u B
R9 10
C6 0.47u B
C5 0.47u B
C4 0.47u B
C21 47u 10V TA
CL8
CL9
CL10
R11 3.3
B+
C11 0.01u B
C12 0.01u B
C10 0.47u B
R8 10
C7 0.47u B
FB1
R7 10
C8 0.47u B
R12 3.3
FB2
CL7
CL1
CL2
CL3
R6 470
R5 470
R10 10
FB3
C9 0.47u B
C19 1u B
C23 47p CH
C20 0.1u B
C13 47p CH
R16 220
C14 0.01u CH
R14 0
R15 0
CL6
CL5
X1 24.576MHz
R2 10k
R4 39k
L6 3.3uH 2520
R3 39k
C17 0.33u B
C18 0.033u B
D1 BB135
C15 15p CH
C16 18p CH
R1 8200
CL4
C3 0.47u B
R13 10
05
PS1 0.4A CCP2E10
JL1
JL2
JL3
CL12
CL13
CL14
JL11
CN1 13P
Vcc (5V)
NC (GND)
L OUT
R OUT
NC
NC (GND)
NC
SDA
SCLK
EXT L
EXT R
SIF1
GND
MA-323 BOARD(7/10) CN751
(SEE PAGE 4-24)

no mark : REC/PB mode

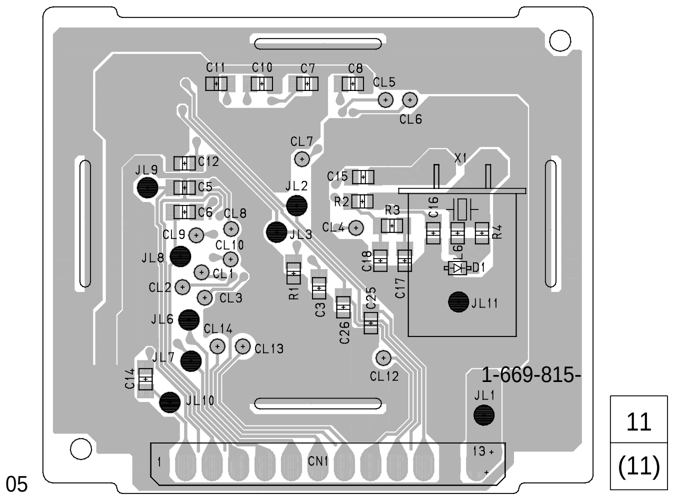
• SIGNAL PATH

	AUDIO SIGNAL
REC	➡
PB	⇨

NK-11 BOARD(SIDE A)

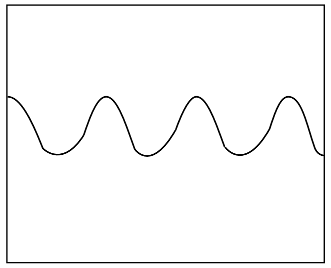

FB2
FB1
R7
R8
R14
R9
C22
R12
R15
IC1
C21
C2
C4
R11
R13
C20
C13
C23
R16
C19
C9
FB3
R10
R6
R5
PS1
1
12
22
23
33
34
44
1-669-815-
11
(11)
05

NK-11 BOARD(SIDE B)


C11
C10
C7
C8
CL5
CL6
CL7
X1
JL9
C12
C5
C6
CL8
JL2
C15
R2
R3
C16
R4
CL9
CL10
JL3
CL4
JL8
CL1
R1
C3
C18
C17
L6
D1
CL2
CL3
C25
JL11
JL6
CL14
CL13
C26
C14
JL7
JL10
CL12
JL1
1-669-815-
CN1
1
13
11
(11)
05

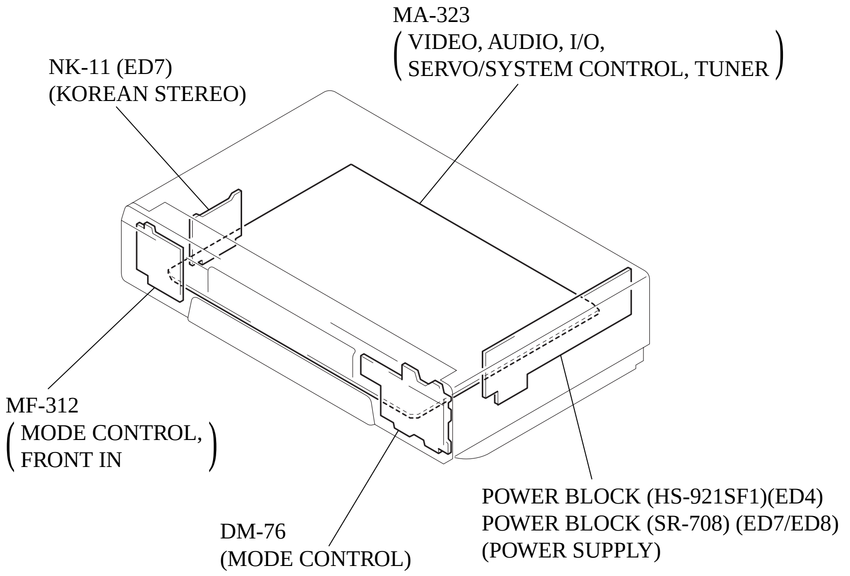
• Waveform

❶ IC1 ⑯ REC/PB



740m Vp-p (24.576 MHz)

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.


MA-323
(VIDEO, AUDIO, I/O, SERVO/SYSTEM CONTROL, TUNER)
NK-11 (ED7)
(KOREAN STEREO)
MF-312
(MODE CONTROL, FRONT IN)
DM-76
(MODE CONTROL)
POWER BLOCK (HS-921SF1)(ED4)
POWER BLOCK (SR-708) (ED7/ED8)
(POWER SUPPLY)

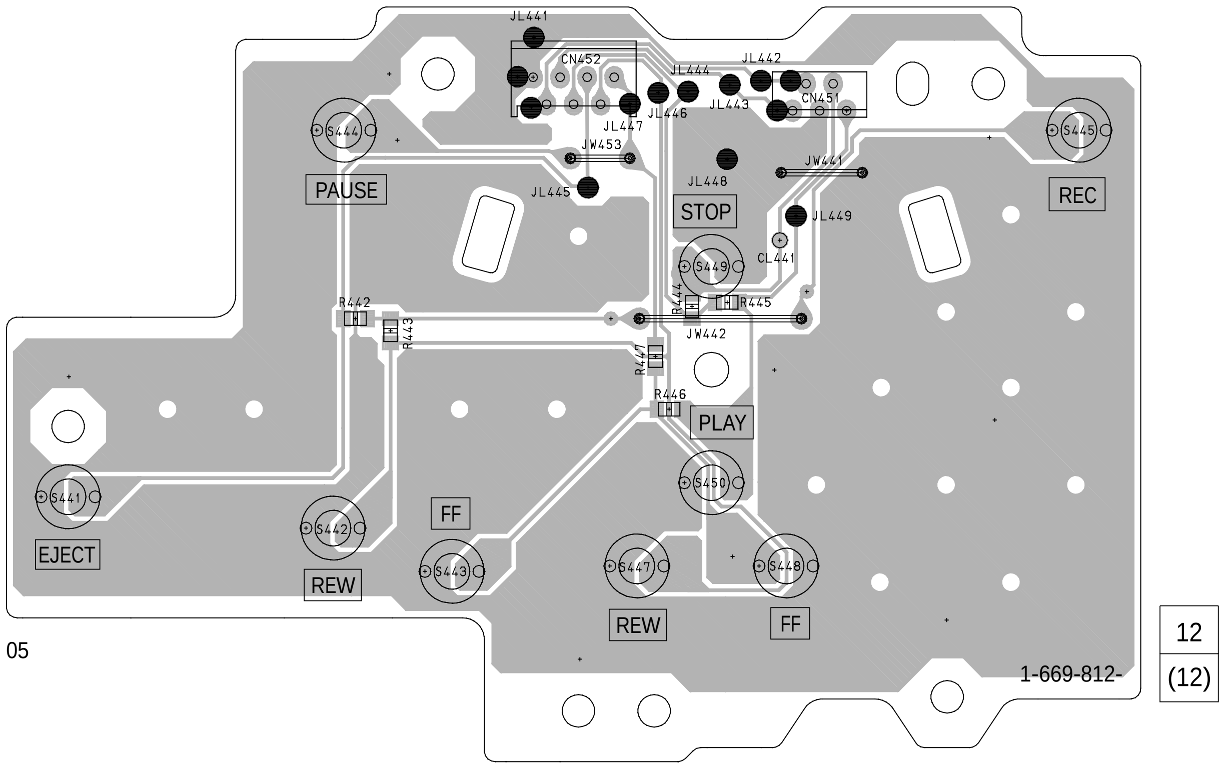
DM-76 (MODE CONTROL), MF-312 (MODE CONTROL, FRONT IN) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

– Ref. No.: DM-76 board, MF-312 board; 1,000 series –

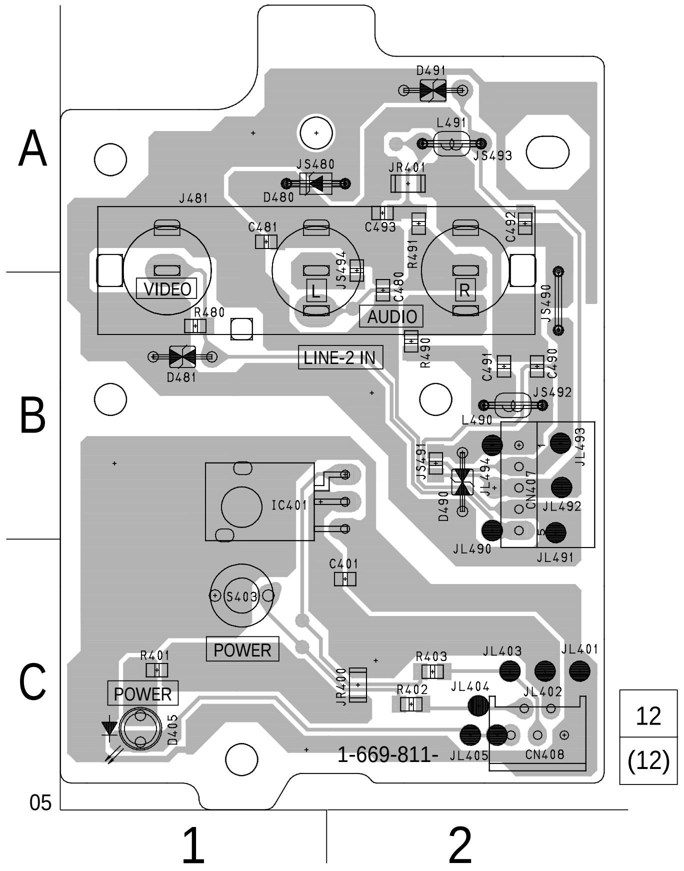
– SLV-ED4/ED7/ED8 –

There are few cases that the part isn't mounted in this model is printed on this diagram.

DM-76 BOARD

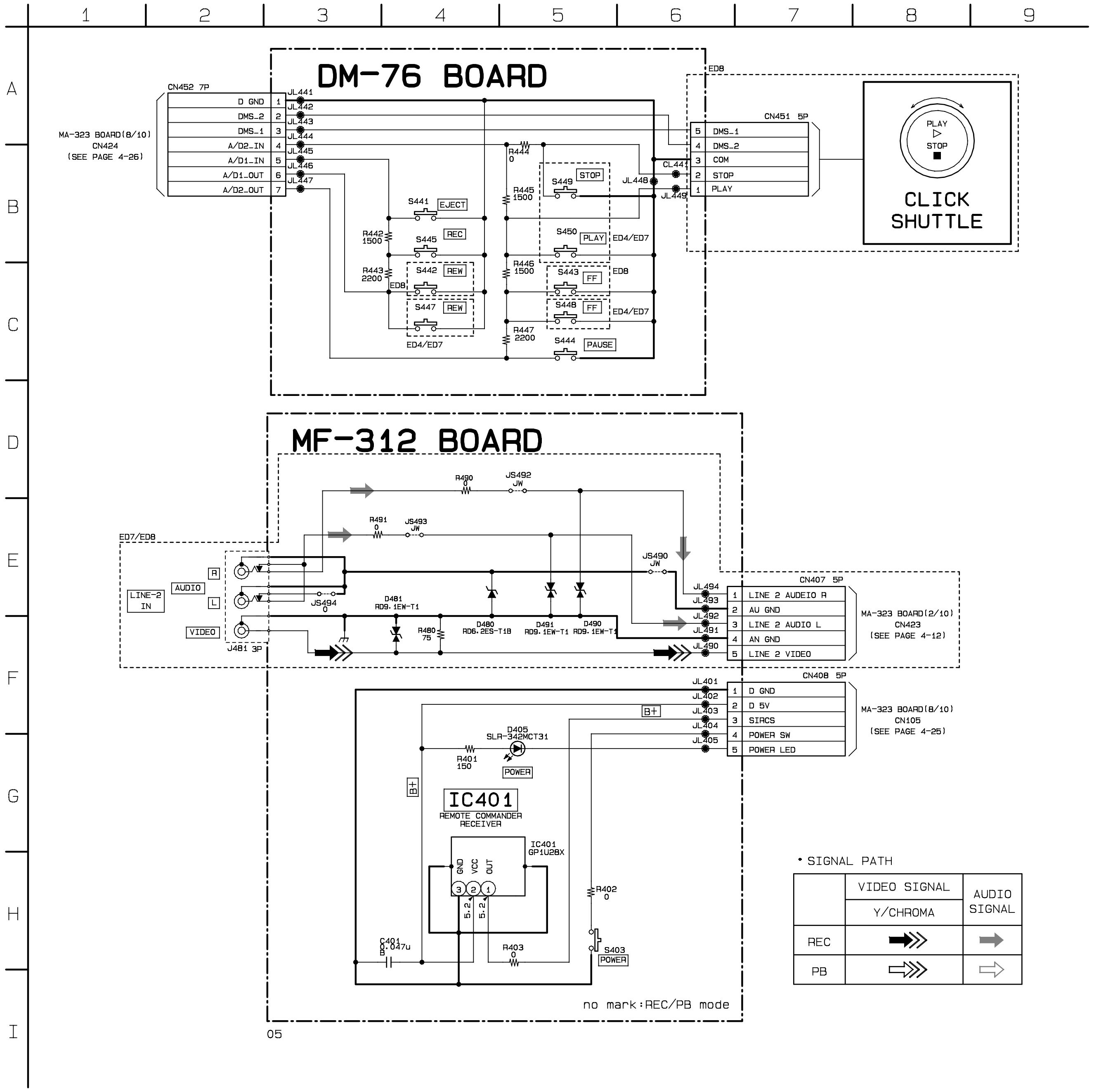

JL441
CN452
JL442
JL444
CN451
JL446
JL443
JL447
JW453
JL448
JW441
JL445
S444
PAUSE
STOP
REC
S445
JL449
CL441
S449
R442
R443
R444
R445
JW442
R447
R446
PLAY
S441
EJECT
S442
REW
FF
S443
S450
S447
REW
S448
FF
05
1-669-812-
12
(12)

MF-312 BOARD


A
B
C
1
2
D491
L491
JS480
JR401
JS493
J481
D480
C481
C493
C492
JS494
R491
VIDEO
L
R
C480
AUDIO
JS490
R480
R490
LINE-2 IN
D481
C491
C490
JS492
L490
JL493
JS491
D490
JL494
CN407
JL492
IC401
JL490
JL491
C401
S403
POWER
R401
R403
JL403
JL401
JR400
R402
JL404
JL402
POWER
D405
1-669-811-
JL405
CN408
05
12
(12)

MF-312 BOARD

CN407	B-2
CN408	C-2
D405	C-1
D480	A-1
D481	B-1
D490	B-2
D491	A-2
IC401	B-1

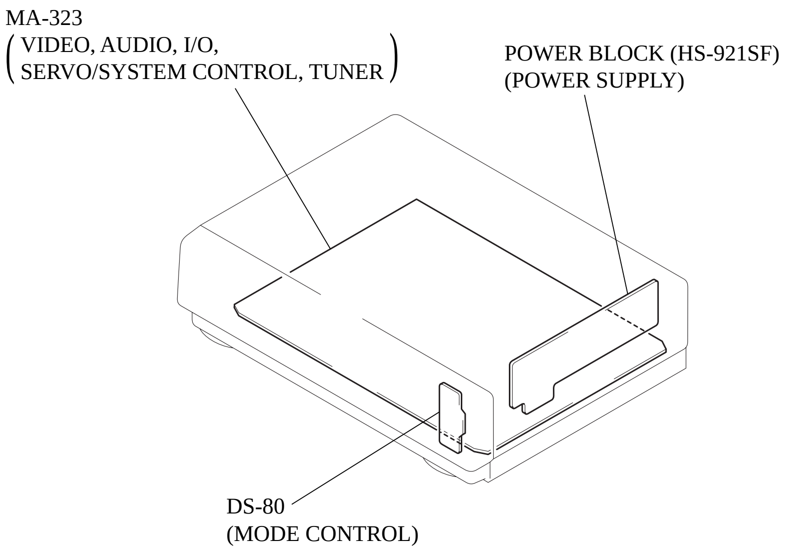

1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
G
H
I
DM-76 BOARD
CN452 7P
D GND
DMS_2
DMS_1
A/D2_IN
A/D1_IN
A/D1_OUT
A/D2_OUT
MA-323 BOARD(8/10)
CN424
(SEE PAGE 4-26)
JL441
JL442
JL443
JL444
JL445
JL446
JL447
R444
0
R445
1500
S449
STOP
JL448
CL441
JL449
S441
EJECT
R442
1500
S445
REC
S450
PLAY
ED4/ED7
R443
2200
S442
REW
ED8
R446
1500
S443
FF
S447
REW
S448
FF
ED4/ED7
R447
2200
S444
PAUSE
ED8
CN451 5P
DMS_1
DMS_2
COM
STOP
PLAY
PLAY
STOP
CLICK
SHUTTLE
MF-312 BOARD
R490
0
JS492
JW
R491
0
JS493
JW
ED7/ED8
JS490
JW
LINE-2
IN
AUDIO
R
L
VIDEO
JS494
D481
RD9.1EW-T1
R480
75
D480
RD6.2ES-T1B
D491
RD9.1EW-T1
D490
RD9.1EW-T1
J481 3P
JL494
JL493
JL492
JL491
JL490
CN407 5P
LINE 2 AUDIO R
AU GND
LINE 2 AUDIO L
AN GND
LINE 2 VIDEO
MA-323 BOARD(2/10)
CN423
(SEE PAGE 4-12)
JL401
JL402
JL403
JL404
JL405
CN408 5P
D GND
D 5V
SIRCS
POWER SW
POWER LED
MA-323 BOARD(8/10)
CN105
(SEE PAGE 4-25)
B+
D405
SLR-342MCT31
R401
150
POWER
B+
IC401
REMOTE COMMANDER
RECEIVER
IC401
GP1U28X
GND
VCC
OUT
5.2
5.2
R402
0
C401
0.047u
R403
0
S403
POWER
no mark:REC/PB mode
05
• SIGNAL PATH
VIDEO SIGNAL
Y/CHROMA
AUDIO SIGNAL
REC
PB

HS-921SF/921SF1 (POWER SURRLY) PRINTED WIRING BOARD

– Ref. No.: HS-921SF/921SF1 board; 3,000 series –

There are few cases that the part isn't mounted in this model is printed on this diagram.

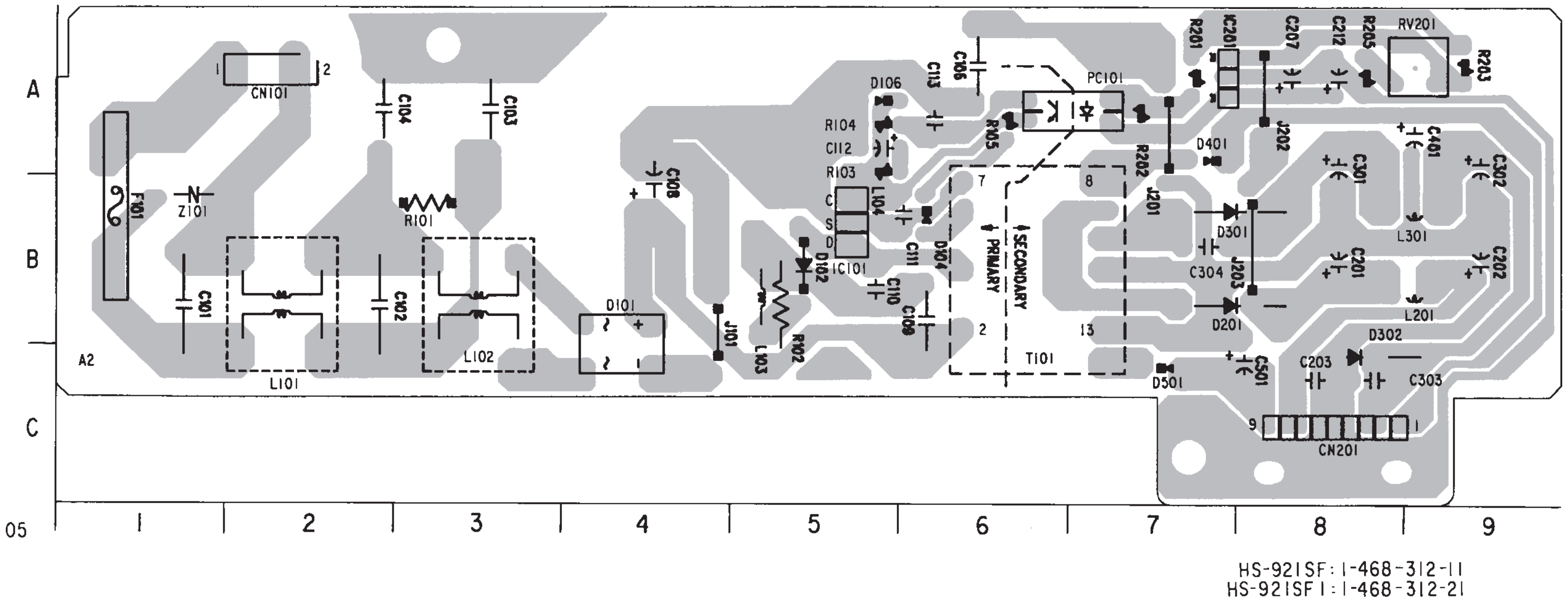
– SLV-ED1/ED4 –

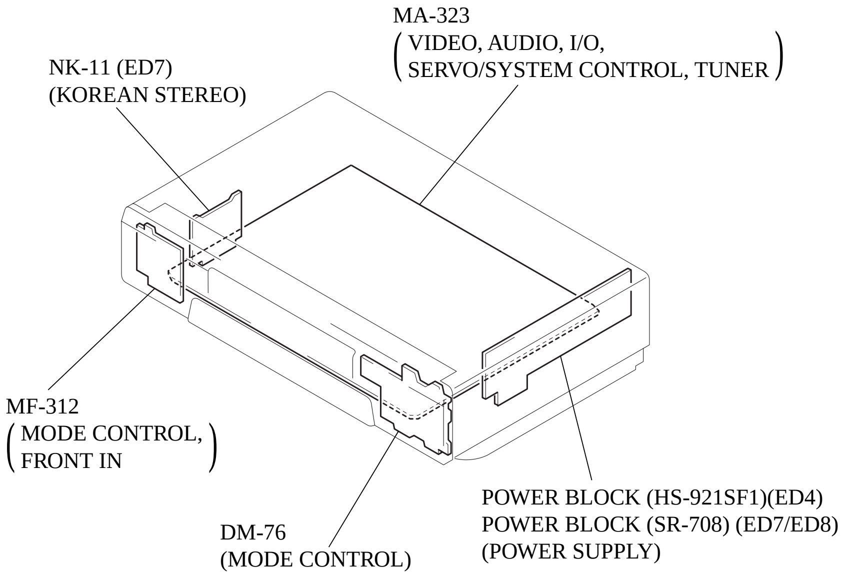

MA-323
VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER
POWER BLOCK (HS-921SF)
(POWER SUPPLY)
DS-80
(MODE CONTROL)

HS-921SF/921SF1
BOARD

CN101	A-2
CN201	C-8
D101	B-4
D102	B-5
D104	B-6
D106	A-5
D201	B-7
D301	B-7
D302	C-8
D401	A-7
D501	C-7
IC101	B-5
IC201	A-7

HS-921SF/921SF1 BOARD

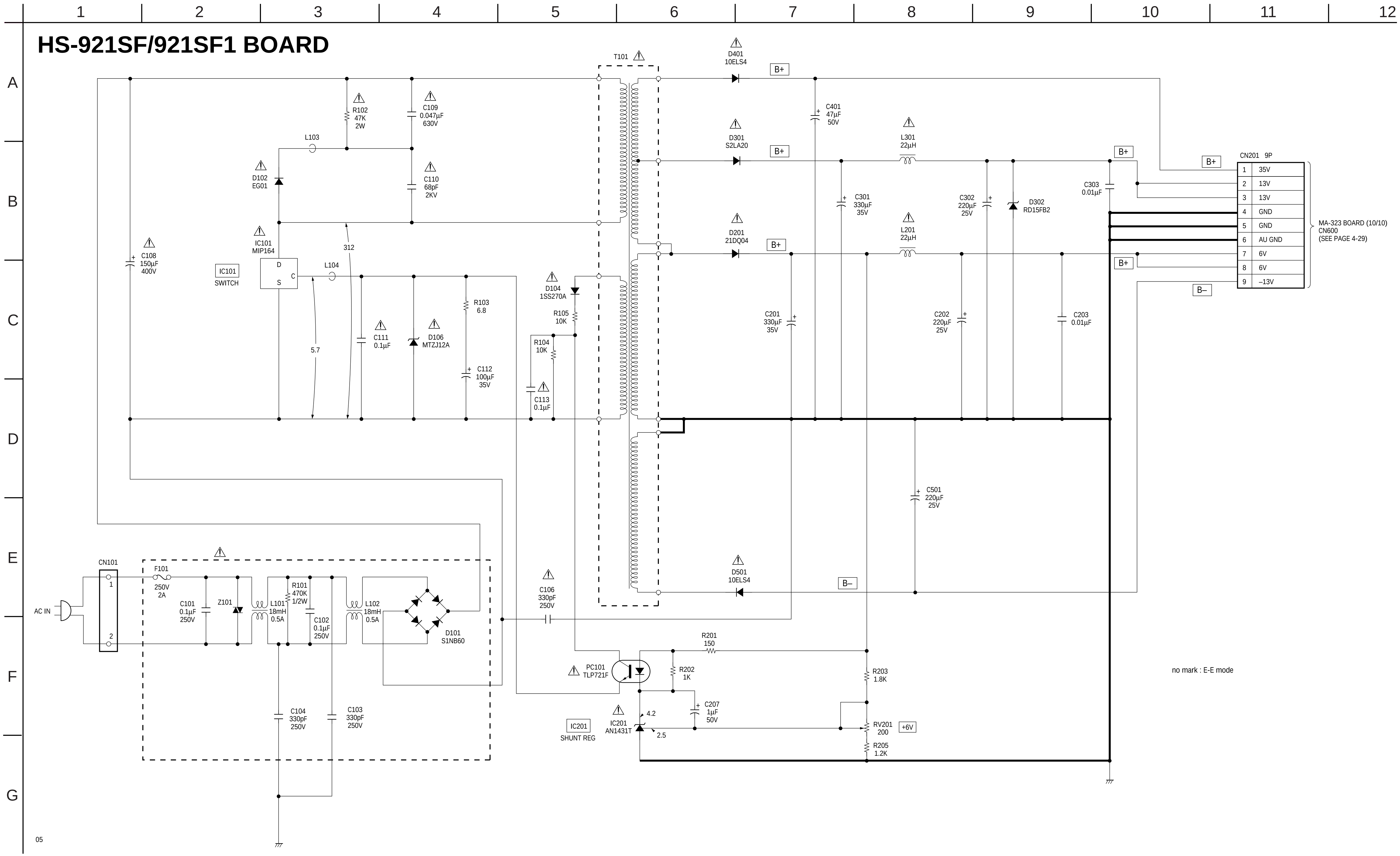

A
B
C
CN101
C104
C103
F101
Z101
R101
C101
C102
L101
L102
D101
C108
D106
C113
C106
PC101
R104
C112
R103
R105
L104
C111
D104
D102
IC101
C110
C109
J101
R102
L103
PRIMARY
SECONDARY
T101
R201
IC201
C207
C212
R205
RV201
R203
R202
J201
D401
J202
C401
C301
C302
D301
C304
J203
C201
L301
C202
D201
L201
D302
C501
C203
C303
D501
CN201
A2
05
1
2
3
4
5
6
7
8
9
HS-921SF: 1-468-312-11
HS-921SF1: 1-468-312-21


MA-323
VIDEO, AUDIO, I/O,
SERVO/SYSTEM CONTROL, TUNER
NK-11 (ED7)
(KOREAN STEREO)
MF-312
MODE CONTROL,
FRONT IN
DM-76
(MODE CONTROL)
POWER BLOCK (HS-921SF1)(ED4)
POWER BLOCK (SR-708) (ED7/ED8)
(POWER SUPPLY)

HS-921SF/921SF1 (POWER SUPPLY) SCHEMATIC DIAGRAM

– Ref. No.: HS-921SF/921SF1 board; 3,000 series –

– SLV-ED1/ED4 –


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
HS-921SF/921SF1 BOARD
T101
D401
10ELS4
B+
C401
47µF
50V
R102
47K
2W
C109
0.047µF
630V
L103
D301
S2LA20
L301
22µH
CN201 9P
1 35V
2 13V
3 13V
4 GND
5 GND
6 AU GND
7 6V
8 6V
9 –13V
MA-323 BOARD (10/10)
CN600
(SEE PAGE 4-29)
D102
EG01
C110
68pF
2KV
C301
330µF
35V
C302
220µF
25V
D302
RD15FB2
C303
0.01µF
IC101
MIP164
312
D201
21DQ04
L201
22µH
C108
150µF
400V
IC101
SWITCH
D
C
S
L104
D104
1SS270A
B–
R103
6.8
R105
10K
C201
330µF
35V
C202
220µF
25V
C203
0.01µF
C111
0.1µF
D106
MTZJ12A
R104
10K
5.7
C112
100µF
35V
C113
0.1µF
C501
220µF
25V
CN101
F101
250V
2A
C106
330pF
250V
D501
10ELS4
AC IN
C101
0.1µF
250V
Z101
L101
18mH
0.5A
R101
470K
1/2W
C102
0.1µF
250V
L102
18mH
0.5A
D101
S1NB60
R201
150
PC101
TLP721F
R202
1K
R203
1.8K
no mark : E-E mode
C207
1µF
50V
4.2
IC201
AN1431T
IC201
SHUNT REG
2.5
RV201
200
+6V
R205
1.2K
C104
330pF
250V
C103
330pF
250V
05

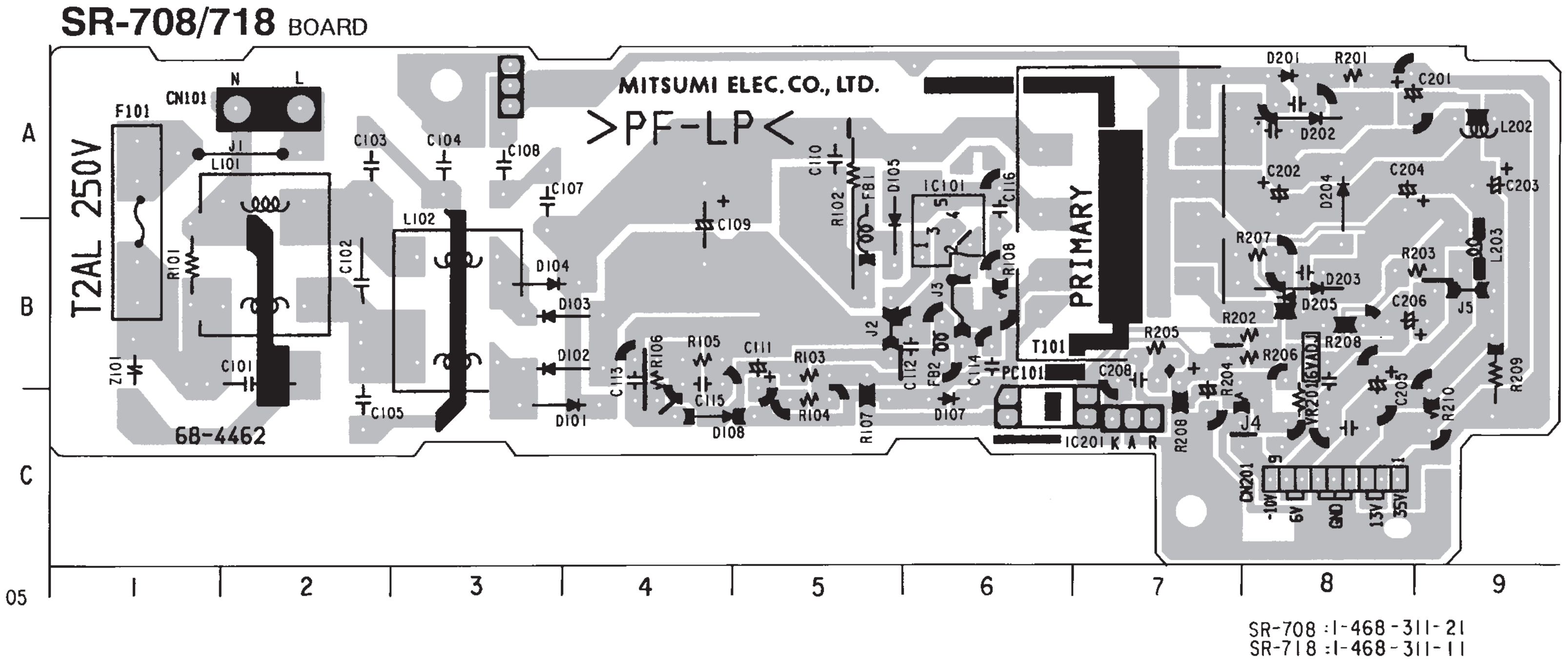
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SR-708 (POWER SUPPLY) PRINTED WIRING BOARD

– Ref. No.: SR-708 board; 4,000 series –

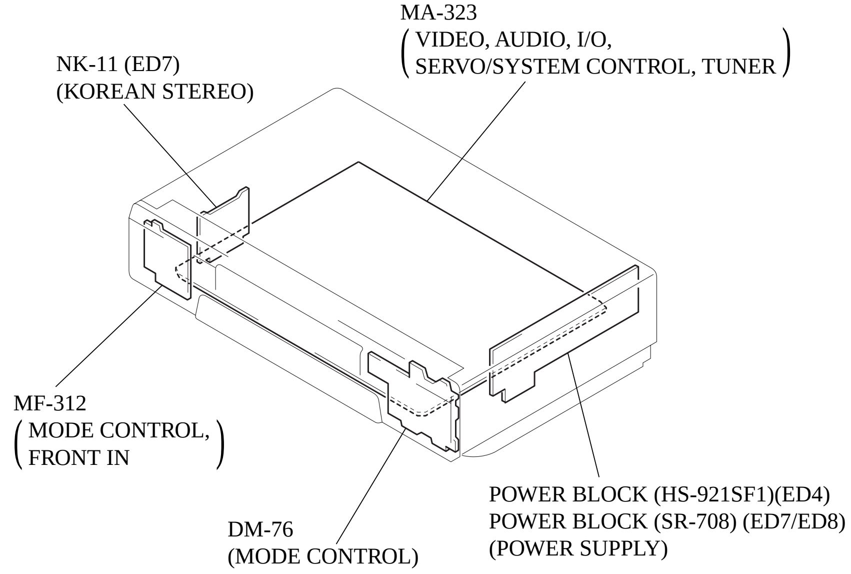
– SLV-ED7/ED8 –

There are few cases that the part isn't mounted in this model is printed on this diagram.


SR-708/718 BOARD
MITSUMI ELEC. CO., LTD.
>PF-LP<
T2AL 250V
F101
CN101
N
L
J1
L101
R101
C101
C102
C103
C104
C105
C107
C108
C109
C110
C111
C112
C113
C114
C115
C116
L102
D101
D102
D103
D104
D105
D107
D108
D201
D202
D203
D204
D205
R102
R103
R104
R105
R106
R107
R108
FB1
FB2
IC101
J2
J3
J4
J5
PC101
PRIMARY
T101
C201
C202
C203
C204
C205
C206
C208
R201
R202
R203
R204
R205
R206
R207
R208
R209
R210
L202
L203
VR201
IC201
K A R
CN201
-10V
6V
GND
13V
35V
6B-4462
A
B
C
05
1
2
3
4
5
6
7
8
9
SR-708 :1-468-311-21
SR-718 :1-468-311-11

SR-708 BOARD

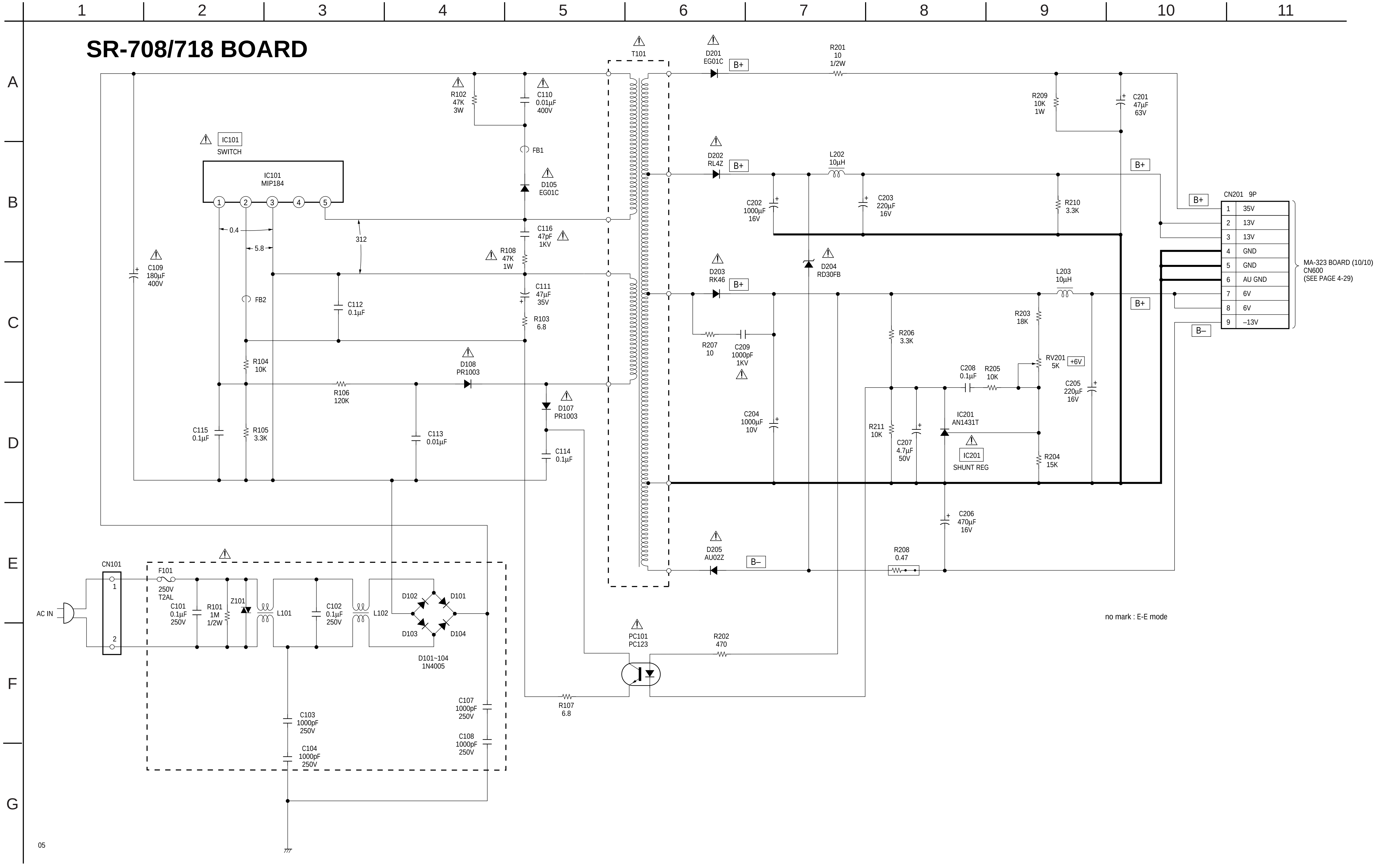
CN101	A-2
CN201	C-8
D101	C-3
D102	B-3
D103	B-3
D104	B-3
D105	B-5
D107	C-6
D108	C-4
D201	A-8
D202	A-8
D203	B-8
D204	A-8
D205	B-8
IC101	B-6
IC201	C-7


MA-323
(VIDEO, AUDIO, I/O, SERVO/SYSTEM CONTROL, TUNER)
NK-11 (ED7)
(KOREAN STEREO)
MF-312
(MODE CONTROL, FRONT IN)
DM-76
(MODE CONTROL)
POWER BLOCK (HS-921SF1)(ED4)
POWER BLOCK (SR-708) (ED7/ED8)
(POWER SUPPLY)

SR-708 (POWER SUPPLY) SCHEMATIC DIAGRAM

– Ref. No.: SR-708 board; 4,000 series –

– SLV-ED7/ED8 –


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
SR-708/718 BOARD
T101
D201
EG01C
B+
R201
10
1/2W
R102
47K
3W
C110
0.01µF
400V
R209
10K
1W
C201
47µF
63V
IC101
SWITCH
FB1
D202
RL4Z
L202
10µH
IC101
MIP184
D105
EG01C
C202
1000µF
16V
C203
220µF
16V
R210
3.3K
CN201 9P
1 35V
2 13V
3 13V
4 GND
5 GND
6 AU GND
7 6V
8 6V
9 –13V
MA-323 BOARD (10/10)
CN600
(SEE PAGE 4-29)
0.4
5.8
312
C116
47pF
1KV
R108
47K
1W
C109
180µF
400V
D203
RK46
D204
RD30FB
L203
10µH
C111
47µF
35V
FB2
C112
0.1µF
R103
6.8
R203
18K
R207
10
C209
1000pF
1KV
R206
3.3K
RV201
5K
+6V
C208
0.1µF
R205
10K
C205
220µF
16V
R104
10K
D108
PR1003
R106
120K
D107
PR1003
C204
1000µF
10V
IC201
AN1431T
R211
10K
C207
4.7µF
50V
IC201
SHUNT REG
R204
15K
C115
0.1µF
R105
3.3K
C113
0.01µF
C114
0.1µF
C206
470µF
16V
D205
AU02Z
B–
R208
0.47
CN101
F101
250V
T2AL
AC IN
C101
0.1µF
250V
R101
1M
1/2W
Z101
L101
C102
0.1µF
250V
L102
D102
D101
D103
D104
D101~104
1N4005
PC101
PC123
R202
470
no mark : E-E mode
C107
1000pF
250V
C108
1000pF
250V
R107
6.8
C103
1000pF
250V
C104
1000pF
250V
05

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SECTION 5
INTERFACE, IC PIN FUNCTION DESCRIPTION

5-1. SYSTEM CONTROL – VIDEO BLOCK INTERFACE (MA-323 BOARD IC161)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	REC • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
RF SWP (SW30)	MA-323 IC161㉔	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
QVD	MA-323 IC161㉗	O	L	L	L	*2	*3	*3	*3	*3	*3	L	L
C SYNC	MA-323 IC161(54)	I	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4

*1. 30 Hz pulse with 50% duty cycle. Synchronized with rotation of drum.
*2. Normal PB “L”. V period “H” pulse when ×1.
*3. V period “H” pulse.
*4. Composite Sync signal (positive polarity).

5-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE (MA-323 BOARD IC161)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
CAP QR	MA-323 IC161(94)	O	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	*2	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z
DRM PG	MA-323 IC161㊴	I	*3	*1	*1	*4	*4	*1	*1	*1	*1	*1	*1	*1	*1
DRM FG	MA-323 IC161㊳	I	*3	*6	*6	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6
CAP FG	MA-323 IC161㊵	I	H/L	*5	*5	*4	*4	*5	H/L	*5	*5	*5	*5	*5	H/L
CAP VS	MA-323 IC161㉕	O	*7	*7	*7	*7	*7	*8	*7	*7	*8	*8	*8	*8	*7
DRM VS	MA-323 IC161㉖	O	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9

*1. 30 Hz pulse.
*2. Pulse at tape running.
*3. “L” when drum rotation stop.
*4. Unstable period pulse.
*5. Pulse of period in proportion to tape speed.
*6. 360 Hz pulse.
*7. Pulse at tape running.
*8. Approx. 2 msec period “H” or “L” pulse.
*9. Approx. 1.5 msec period “H” or “L” pulse.

5-3. SYSTEM CONTROL – MECHANISM BLOCK INTERFACE (MA-323 BOARD IC161)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
CAM	MA-323 IC161(83)	O	Hi-Z	H	L	H	L	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
MODE 1	MA-323 IC161(84)	I	H	L	L	*1	*1	H	H	H	H	H	H	H	H	L	H	H
MODE 2	MA-323 IC161(85)	I	H	L	L	*1	*1	H	H	H	L	L	L	L	L	L	L	L
MODE 3	MA-323 IC161(86)	I	L	L	L	*1	*1	H	L	L	L	L	L	L	L	H	L	L
MODE 4	MA-323 IC161(87)	I	L	H	H	*1	*1	L	H	H	L	L	L	L	L	L	L	L
C IN REC PRF	MA-323 IC161(55)	I	H	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
T REEL FG	MA-323 IC161(88)	I	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
S REEL FG	MA-323 IC161(89)	I	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
T/S LED	MA-323 IC161(74)	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
$\overline{\text{CAP RVS}}$	MA-323 IC161(93)	I	L			H	L	H/L	H	L	H	H	H	H	H	L	H	H
T SENS	MA-323 IC161⑫	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
S SENS	MA-323 IC161⑪	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6

*1. Uncertainty.
*2. “L” when erasing protection tab is bent, “H” when not bent.
*3. Pulse of period in proportion to reel rotating speed.
*4. Approx. 2 msec period “H” pulse.
*5. Pulse at tape running.
*6. Normally “L”. 2 msec period “H” pulse when tape top or tape end is detected.
*7. When transition to UNLOADING direction: L.
When transition to LOADING direction: H.
When CAM motor is stopped: Hi-Z.

5-4. SYSTEM CONTROL – AUDIO BLOCK INTERFACE (MA-323 BOARD IC161)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOADING	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	PB • PAUSE
AU RF	MA-323 IC161⑭	I	AF RF envelope signal input terminal for automatic tracking.										
A MUTE	MA-323 IC161(79)	O (O.D)	Hi-Z	Hi-Z	Hi-Z	Hi-Z	H	H	H	H	H	L	L
AF REC P	MA-292 IC161(60)	O	H	H	H	H	H	H	H	H	H	L	H
AF SWP	MA-292 IC161㉓	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
$\overline{\text{FULL ERS}}$	MA-292 IC161(91)	O (O.D)	H	H	H	H	H	H	H	H	H	L	H
AF REC	MA-323 IC161(59)	O	L	L	L	L	L	L	L	L	L	H	H
REC P	MA-323 IC161(75)	O	L	L	L	L	L	L	L	L	L	H	L

*1. 30 Hz 50% duty pulse approx. 5 msec delayed from RF SW P.

5-5. SERVO/SYSTEM/TIMER/TUNER CONTROL MICROPROCESSOR PIN FUNCTION (MA-323 BOARD IC161)

Pin No.	Pin Name	I/O	Function
1	F MONO	O	TUNER Audio select signal
2	AN GND	–	Analog Ground
3	APC ERROR	I	APC ERROR Voltage input
4	DMS UP	I	Click Shuttle fowared/reverse signal input (DMS models only)
5	FUNC. KEY2	I	Function Key Analog voltage input
6	TU AFT	I	AFT (Auto fine tuning signal input)
7	FUNC. KEY1	I	Function Key Analog voltage input
8	POWER FAIL	I	Power failure detect signal input
9	DMS DOWN	I	Click Shuttle fowared/reverse signal input (DMS models only)
10	DEST	I	Destination set
11	S SENS	I	Supply end sensor signal input
12	T SENS	I	Take up end sensor signal input
13	VIDEO RF	I	Video RF Envelop input
14	AU RF	I	Hifi Audio Envelop input
15	AN 5V	–	Power supply
16	RESET	I	RESET signal input
17	3.58/4.43	O	NTSC color freq. judge signal
18	PAL	O	“H”: PAL (Video block control signal)
19	SAP BILL OUT	I	MAIN/SAP judge input
20	STEREO OUT	I	STEREO/MONO judge input
21	MAIN/SAP	O	MAIN/SAP select signal
22	VCC	–	Power supply
23	AF SWP	O	AF switching pulse output
24	RF SWP	O	RF switching pulse output
25	CAP VS	O	Capstan error signal output
26	DRUM VS	O	Drum motor error signal output
27	QVD	O	Quasi VD pulse output
28	N.C.	–	Not used
29	H. AMPSW	O	“H”: A-DUB mode (CTL Amp. Gain. Coutrol)
30	N.C.	–	Not used
31	CTL (+)	I/O	CTL head signal Input/Output (rec mode)
32	CTL (–)	I/O	CTL head signal Input/Output (rec mode)
33	VSS (SERVO)	–	Ground
34	CTL-AMP1	I	CTL Amp. Coutrol (Gain set)
35	CTL-AMP2	I	CTL Amp. Coutrol (Gain set)
36	CTL-AMP3	I	CTL Amp. Coutrol (Gain set)
37	CTL-AMP OUT	O	CTL Amp. Output (For Check)
38	DRUM FG	I	Drum FG Schmitt amp. input
39	DRUM PG	I	Drum PG Schmitt amp. input
40	CAP FG	I	Capstan FG Schmitt input
41	VCC (SERVO)	–	Power supply
42	VCC(OSD)	–	Power supply
43	CV IN	I	Composite Video signal input
44	VREF	I	Reference bias and clamp bias power pin
45	CV OUT	O	Composite Video signal output
46	N.C.	–	Not used
47	AFC LPF	I	AFC LPF pin
48	AFC OSC	I	AFC oscillator pin
49	VSS (OSD)	–	Ground
50	DOSC-IN	I	OSD dot clock oscillator (input)

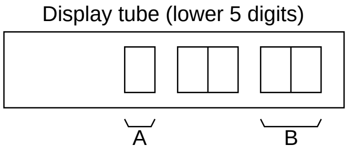
Pin No.	Pin Name	I/O	Function
51	DOSC-OUT	O	OSD dot clock oscillator (output)
52	4FSC-OUT	O	OSD 4fsc oscillator terminal (output)
53	4FSC-IN	I	OSD 4fsc oscillator terminal (input)
54	CSYNC	I	Composite Sync signal input
55	REC PRF	I	Erasing protection tab. Cassette in detection
56	IIC DATA	O	EEP ROM, Hifi IC, Tuner/Serial communication signal (IIC DATA)
57	IIC CLOCK	O	EEP ROM, Hifi IC, Tuner/Serial communication signal (IIC CLOCK)
58	DRUM QR	O	Drum motor step driving
59	AF REC	O	“H” output when Hifi audio REC
60	AF REC P	O	“L” output when Hifi audio REC pause
61	TV/VTR	O	RF output control
62	SSB CLOCK (VIDEO)	O	Video, Video Amp. Serial communication signal (CLOCK)
63	SSB DATA (VIDEO)	O	Video, Video Amp. Serial communication signal (DATA)
64	BLUE BACK	O	OSD block control signal output
65	APC PWM	O	APC PWN signal
66	CAP TRQ PWM	O	Capstan TRQ PWN output
67	TA MUTE	O	“H” output when Tuner mute
68	TEST	I	Fixed to Ground
69	32kHz (IN)	I	Timer Clock terminal (32kHz)
70	32kHz (OUT)	O	Timer Clock terminal (32kHz)
71	VSS	–	Ground
72	10MHz (IN)	I	System clock terminal (10MHz)
73	10MHz (OUT)	O	System clock terminal (10MHz)
74	END LED	O	Top/End LED ON/OFF control
75	REC P	O	“L” output when REC pause mode
76	IN SEL 1	O	LINE-INPUT selection control signal-1
77	IN SEL 2	O	LINE-INPUT selection control signal-2
78	OSD SEL	–	Not used
79	A MUTE	O	“H” Audio mute signal outout
80	WRITE CONT	O	EEPROM write timing control
81	EP. LP	O	“H” : “LP/EP” mode
82	REMOCON	I	Remote control signal (SIRCS) input
83	CAM	O	CAM motor control
84	MODE 1	I	Mechanism section CAM encoder input (data1)
85	MODE 2	I	Mechanism section CAM encoder input (data2)
86	MODE 3	I	Mechanism section CAM encoder input (data3)
87	MODE 4	I	Mechanism section CAM encoder input (data4)
88	T REEL	I	T side reel FG input
89	S REEL	I	S side reel FG input
90	FLD CS	O	FIP driver chip select signal output
91	FUll ERASE	O	Full erase head on/off control signal
92	P CONT	O	Power Supply control signal
93	CAP RVS	O	Capstan reverse control signal H when Reverse
94	CAP QR	O	Capstan step driving
95	S CLOCK 0	O	Serial communication signal (Serial clock)
96	S IN 0	I	Serial communication signal (Data input)
97	S OUT 0	O	Serial communication signal (Data output)
98	PLL CLOCK	O	TUNER PLL clock
99	TU ENABLE	O	TUNER PLL signal chip select
100	PLL DATA	O	TUNER PLL data

5-6. KOREAN STEREO PROCESSOR PIN FUNCTION (NK-11 BOARD IC1)

Pin. No.	Pin Name	I/O	Function
1	OUTL	O	Analog output left
2	OUTR	O	Analog output right
3	VDDA1	–	Analog power supply; DAC circuitry
4	VSSA1	–	Analog ground; DAC circuitry
5	VSSD1	–	Digital ground; DAC circuitry
6	VDDD1	–	Digital power supply; DAC circuitry
7	VSSD2	–	Digital ground; DSP part
8	VDDD2	–	Digital power supply; DSP part
9	TP2	I	Additional test pin 2; connected to ground for normal operation
10	NICAM	–	Not used
11	TP1	I	Additional test pin 1; connected to ground for normal operation
12	PCLK	–	Not used
13	ADDR1	–	Not used
14	Vtune	O	Tuning voltage output for crystal oscillator
15	XTALI	I	Crystal oscillator input
16	XTALO	O	Crystal oscillator output
17	TEST2	I	Test pin 2; connected to ground for normal operation
18	Iref	I	Resistor for reference current generation; front end circuitry
19	ADDR2	–	Not used
20	VSSA2	–	Analog ground; analog front end circuitry
21	VDDA2	–	Analog power supply; analog front end circuitry
22	TEST1	I	Test pin 1; connected to ground for normal operation
23	SIF2	I	Sound IF input 2
24	Vref1	I	Reference voltage; analog front end circuitry
25	SIF1	I	Sound IF input 1
26	CRST		Capacitor for power-on reset
27	VSSD3	–	Digital supply; front end circuitry
28	VDDD3	–	Digital supply; front end circuitry
29	SCL	I	Serial communication signal (IIC CLOCK)
30	SDA	I	Serial communication signal (IIC DATA)
31	SDO	–	Not used
32	WS	–	Not used
33	SCK	–	Not used
34	SYSCLK	–	Not used
35	VDDD4	–	Digital power supply; demodulator circuitry
36	VSSD4	–	Digital ground; demodulator circuitry
37	P1	–	Not used
38	MONOIN	–	Not used
39	EXTIR	I	External audio input right channel
40	EXTIL	I	External audio input left channel
41	Vref2	I	Analog reference voltage digital-to-analog converter and operational amplifiers
42	P2	–	Not used
43	VDDA3	–	Analog power supply; operational amplifiers
44	VSSA3	–	Analog ground; operational amplifiers

SECTION 6
ERROR CODES

This set displays an error code, and a mode code in case of error on the display tube, if the operation stopped by error.
The following provides description concerned.



A: Error code .... Table 6-1
B: Mode code in case of error .... Table 6-2

These codes are displayed at lower 5-digit positions of display tube.
In this case, “ : ” between digits is not displayed.

Table 6-1. Error Codes

Code	Description
0	NO ERROR
1	CAM ENCODER ERROR, LOAD DIRECTION
2	CAM ENCODER ERROR, UNLOAD DIRECTION
3	T REEL ERROR
4	S REEL ERROR
5	CAPSTAN ERROR
6	DRUM ERROR
7	INITIALIZE ERROR
8	CASSETTE UNLOADING ERROR
9	RESERVED

Table 6-2. Mode Codes in Case of Error

Code	Description
0	EJECT (POWER ON)
1	EJECT (POWER OFF)
2	UNLOAD STOP
3	STOP (POWER ON)
4	POWER OFF (CASSETTE IN)
5	F. FWD
6	REW
7	LOW SPEED F. FWD
8	LOW SPEED REW
9	STANDBY
10	REC
11	REC (VISS)
12	REC PAUSE
13	PLAY
14	A. DUB
15	A. DUB PAUSE
16	CUE
17	REV
18	STILL (MECHA FWD)
19	FWD FRAM BY FRAM (FWD SLOW)
20	STILL (MECHA RVS)
21	RVS FRAM BY FRAM (RVS SLOW)

SECTION 7
ADJUSTMENTS

During the adjustment, see the Parts Arrangement Diagram for Adjustments on Page 7-6.

7-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT VI.

7-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used

1) Color TV
2) Oscilloscope 1 or 2 phenomena, band more than 30 MHz, delay mode, as provided.
3) NTSC pattern generator
4) Digital voltmeter
5) Audio level meter
6) Audio noise meter
7) Audio generator
8) Attenuator
9) Alignment tape
   Part Code: 8-192-605-32 KRV-51N2

2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

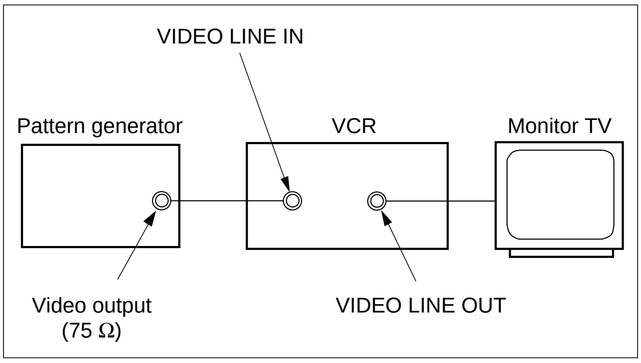


Fig. 7-2-1

2-1-3. Set-up of Adjustment

In this adjustment, NTSC pattern generator is connected with LINE input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal SYNC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst signal and "red" signal are 0.30: 0.66. Fig. 7-2-2. shows video signals (color bars) used in adjusting the video section.

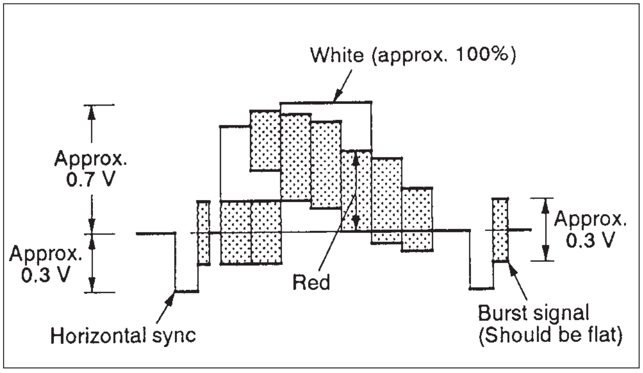


Fig. 7-2-2

2-1-4. Alignment Tapes
[Alignment Tape (KRV-51N2)]

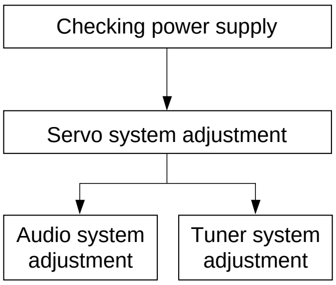
	Mode	Time	Video signal	Audio signal (HiFi/Normal)
1	SP	Seven minutes	Color bar	400 Hz
2	SP	Three minutes	Monoscope	
3	EP	Seven minutes	Color bar	
4	EP	Three minutes	Monoscope	

2-1-5. Specified I/O Level and Impedance
Input/output terminal

Video inputs	LINE IN : phono jack 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio inputs	LINE IN : phono jacks 47 kW, –7.5 dBs (0 dBs = 0.775 Vrms) More than 10 kW, –4 dBs
Video outputs	LINE OUT: phono jack 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio outputs	LINE OUT: phono jacks –7.5 dBs at load impedance 47 kΩ Output impedance : less than 10 Ω

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.


Checking power supply
Servo system adjustment
Audio system adjustment
Tuner system adjustment

2-2. POWER SUPPLY ADJUSTMENT

2-2-1. Power Supply Check
(HS-921SF/921SF1 BOARD,
SR-708 BOARD)

Mode	E-E
Measuring Instrument	Digital voltmeter
–10 V check	
Measurement Point	Pin ⑨ of CN600
Specified Value	–10.3 ±0.8 V
+6 V check	
Measurement Point	Pin ⑦, ⑧ of CN600
Specified Value	5.9 ± 0.2 V
+13 V check	
Measurement Point	Pin ②, ③ of CN600
Specified Value	13.3 ± 0.5 V
+35 V check	
Measurement Point	Pin ① of CN600
Specified Value	38.0 ± 3.0 V

Checking Method:

1) Confirm that each voltage meets its specified value.

2-2-2. +6 V Adjustment
(HS-921SF/921SF1 BOARD,
SR-708 BOARD)

Mode	REC or PB
Measuring Instrument	Digital voltmeter
Measurement Point	Pin ⑦, ⑧ of CN201
Adjusting Element	RV201
Specified Value	5.9 ± 0.2 V

2-3. SERVO SYSTEM Adjustment

2-3-1. RF Switching Position Adjustment (MA-323 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output.
Improve the interchangeability with other tapes and sets.
When it is out of order, the interval appears on the screen, the screen is disturbed.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement Point	CH1: VIDEO LINE OUT CH2: Pin ② of CN501 (RF SWP)
Measuring Instrument	Oscilloscope
Specified Value	6.5 ± 0.5 H (410 ± 32 μsec)

Adjusting Method:

1) Connect MA-323 board JS140 to the GND for about 1 secont to activate the RF switching position adjustment mode.
2) Check appear "A P" on FL display.
3) Using the channel + and – buttons, adjust to 6.5 ± 0.5 H.
4) Press the pause button.

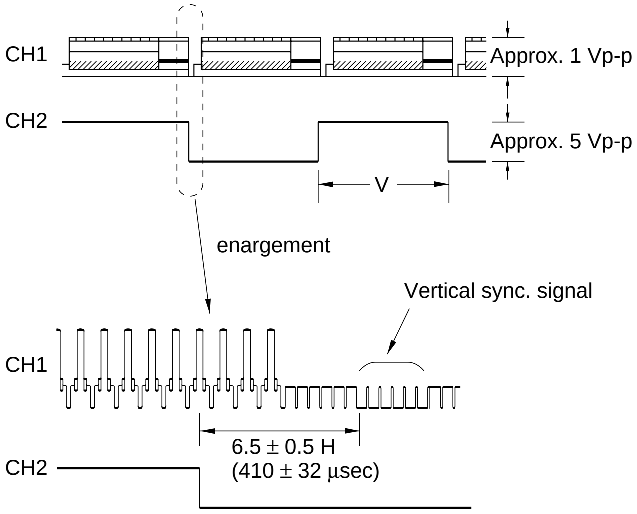

CH1
CH2
Approx. 1 Vp-p
Approx. 5 Vp-p
V
enargement
Vertical sync. signal
CH1
CH2
6.5 ± 0.5 H
(410 ± 32 μsec)

Fig. 7-2-3.

2-4. AUDIO SYSTEM ADJUSTMENTS

- Adjust both Lch and Rch.

[Connection]

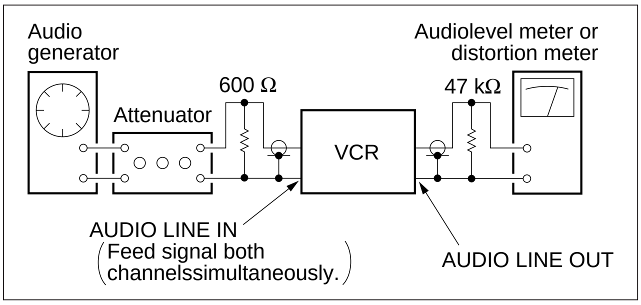

Audio generator
Audiolevel meter or distortion meter
600 Ω
47 kΩ
Attenuator
VCR
AUDIO LINE IN
(Feed signal both channelssimultaneously.)
AUDIO LINE OUT

Fig. 7-2-4.

2-4-1. Hi-Fi Audio System Adjustment (SLV-ED7/ED8)

- Set switches and knobs to the following positions to make adjustment unless otherwise specified.
  INPUT SELECT switch .... LINE
  AUDIO MONITOR .... STEREO

[Adjustment Sequence]

1. **AF Switching Position Adjustment**
2. **Frequency Responce Check**
3. **Overall Level Characteristic and Distortion Factor Check**
4. **Overall S/N Check**

1. AF Switching Position Adjustment (MA-323 Board)

Purpose:

Adjust the interval between A CH and B CH of tape playback output. Improve the interchangeability with other tapes and sets. When it is out of order, noisy sound is increased and big noise is heard.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement point	CH1: Pin ② of CN501 CH2: Pin ① of CN341
Measuring Instrument	Oscilloscope
Specified Value	Fig. 7-2-5

Adjusting Method:

1) Connect MA-323 board JS140 to the GND for about 1 secont to activate the RF switching position adjustment mode.
2) Press the record button to activate the AF switching position adjustment mode.
3) Check appear “A H” on FL display.
4) Using the channels + and – buttons, minimize a chipped portion. At this time, confirm that a noisy sound is not heard.
5) Press the pause button.

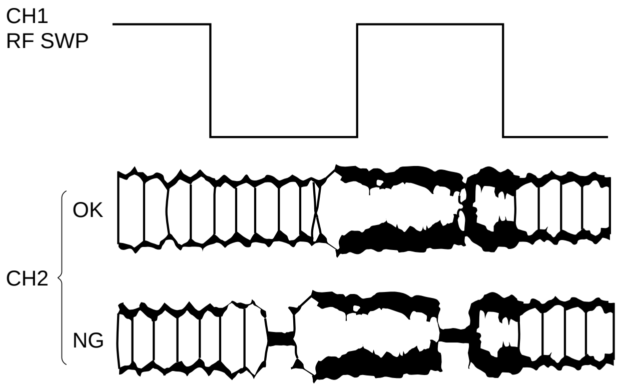


Fig. 7-2-5.

2. Frequency Responce Check

Purpose:

Confirm that the frequency characteristic is within the specification.

Mode	REC and PB (SP mode)
Signal	400 Hz, –7.5 dBs 20 Hz, –7.5 dBs 20 kHz, –7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	0 ± 2 dB

Note: Tape path adjustment must have been completed.

Confirmation Method:

1) Supply a signal of 400 Hz, –7.5 dBs to both L and R channels of Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate –7.5 dBs.
4) Make recording.
5) Set an audio line input signal to 20 Hz and make recording.
6) Set an audio line input signal to 20 kHz and make recording.
7) Playback a recorded portion, and measure output levels at 400 Hz and 20 Hz and 20 kHz.
8) Confirm that the 20 Hz and 20 kHz playback output level within a range of the 400 Hz playback output level 0 ± 2 dB.

3. Overall Level Characteristic and Distortion Factor Check

Purpose:
Check the record level, play level, and distortion factor against the reference input.

Mode	REC and PB (SP mode)
Signal	400 Hz, –7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter and distortion factor meter
Specified value	Playback level: –7.5 ± 2 dBs Distortion factor: 1% or less

Confirmation Method:
1) Supply an audio signal of 400 Hz, –7.5 dBs simultaneously to both L and R channels of Audio Line Input.
2) Make recording
3) Play back a recorded portion.
4) Confirm that a playback level is –7.5 ±2 dBs.
5) Confirm that a distortion factor is within 1%.

4. Overall S/N Check

Purpose:
Confirm that the S/N is within the specification.

Mode	REC and PB (SP mode)
Signal	Short
Measurement point	Audio output terminal
Measurement equipment	Audio noise meter
Specified value	–67.5 dBs or less

Confirmation Method:
1) Connect both L and R channels of audio line input to the GND.
2) Start recording.
3) Play the recorded part to confirm that the noise is below –67.5 dBs.

2-4-2. Normal Audio System Adjustment

- Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
- Set AUDIO MONITOR to normal. (ED7/ED8)

[Adjustment Sequence]

1. **ACE Head Adjustment**
2. **E-E Output Level Check**
3. **Frequency Responce Check**
4. **Overall Level Characteristic and Distortion Factor Check**
5. **Overall S/N Check**

1. ACE Head Adjustment
Refer to the service manual of VHS MECHANICAL ADJUSTMENT VI.

2. E-E Output Level Check

Purpose:
Confirm that the output level against the reference input is within the specification.

Mode	E-E
Signal	L, R: 400 Hz, –7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	–7.5 ± 3 dBs

Confirmation Method:
1) Simultaneously input a signal of 400 Hz, –7.5 dBs to both L and R channels of Audio Line Input.
2) Confirm that the audio output level is –7.5 ± 3 dBs.

3. Frequency Responce Check

Purpose:
Confirm that the frequency characteristic is within the specification.

Mode	REC and PB (SP mode)
Signal	400 Hz, –30.0 dBs 7 kHz, –30.0 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	1 ± 4 dB

Tape path adjustment must have been completed.

Confirmation Method:
1) Supply a signal of 400 Hz, –30.0 dBs to both L and R channels of Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate –30.0 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output level within a range of the 400 Hz playback output level 1 ± 4 dB.

4. Overall Level Characteristic and Distortion Factor Check

Purpose:
Check the record level, play level, and distortion factor against the reference input.

Mode	REC and PB (SP mode)
Signal	400 Hz, –7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter and distortion factor meter
Specified value	Playback level: –7.5 ± 4 dBs Distortion factor: 4% or less

Confirmation Method:
1) Supply an audio signal of 400 Hz, –7.5 dBs simultaneously to both L and R channels of Audio Line Input.
2) Make recording
3) Play back a recorded portion.
4) Confirm that a playback level is –7.5 ± 4 dBs.
5) Confirm that a distortion factor is within 4%.

5. Overall S/N Check

Purpose:
Confirm that the S/N is within the specification.

Mode	REC and PB (SP mode)
Signal	Short
Measurement point	Audio output terminal
Measurement equipment	Audio noise meter
Specified value	–46.0 dBs or less

Confirmation Method:
1) Connect both L and R channels of audio line input to the GND.
2) Start recording.
3) Play the recorded part to confirm that the noise is below –46.0 dBs.

2-5. TUNER SYSTEM ADJUSTMENT

[Connection]

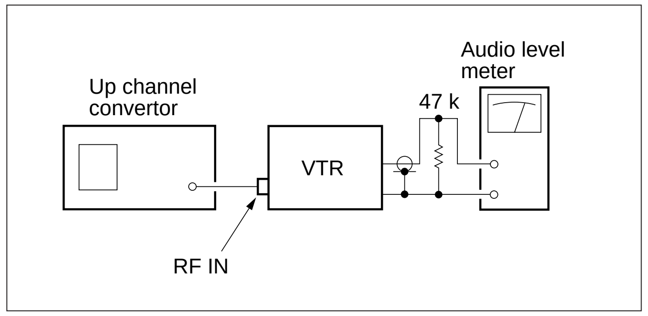


Fig. 7-2-6

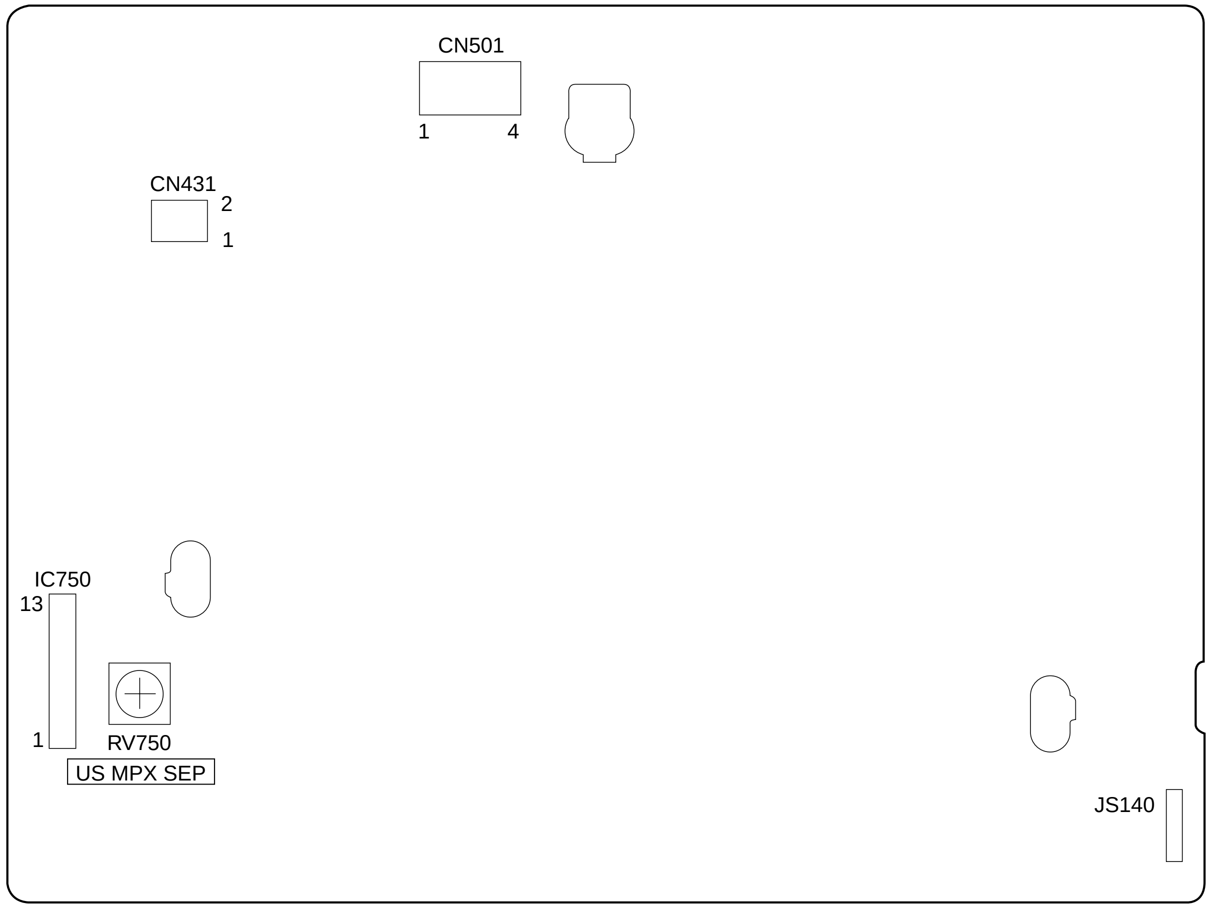
2-5-1. Separation Adjustment (SLV-ED8)

Purpose:
Mixed audio signal separate Lch and Rch.

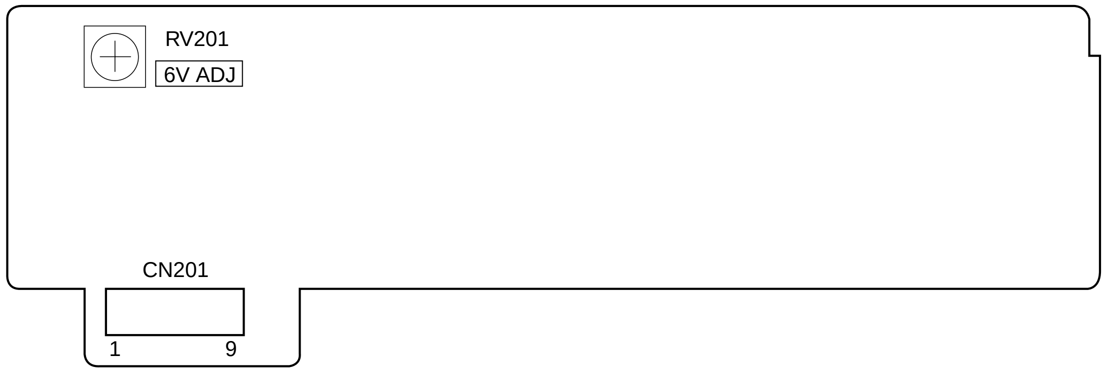
Mode	E-E
Signal	VIDEO: color bar (87.5% modulation) AUDIO: L 1 kHz 100% modulation R no signal ELECTRIC FIELD: 60–80 dBs/75 W Tem
Measurement point	Pin ⑫ of IC750
Measurement equipment	Audio level meter
Adjusting Element	RV750
Specified value	–9.9 ± 0.2 dBm (700 ± 14 mVp-p)

2-6. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

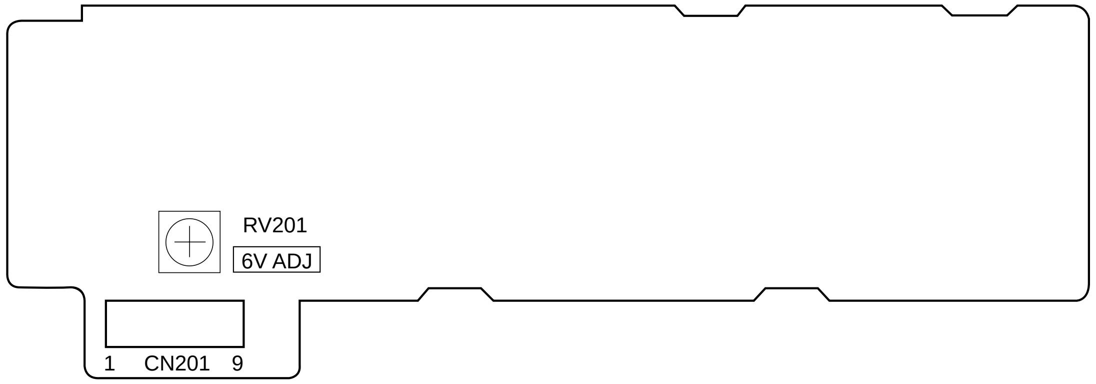
MA-323 BOARD (Side A)



HS-921SF/921SF1 BOARD (Side A)



SR-708 BOARD (Side A)



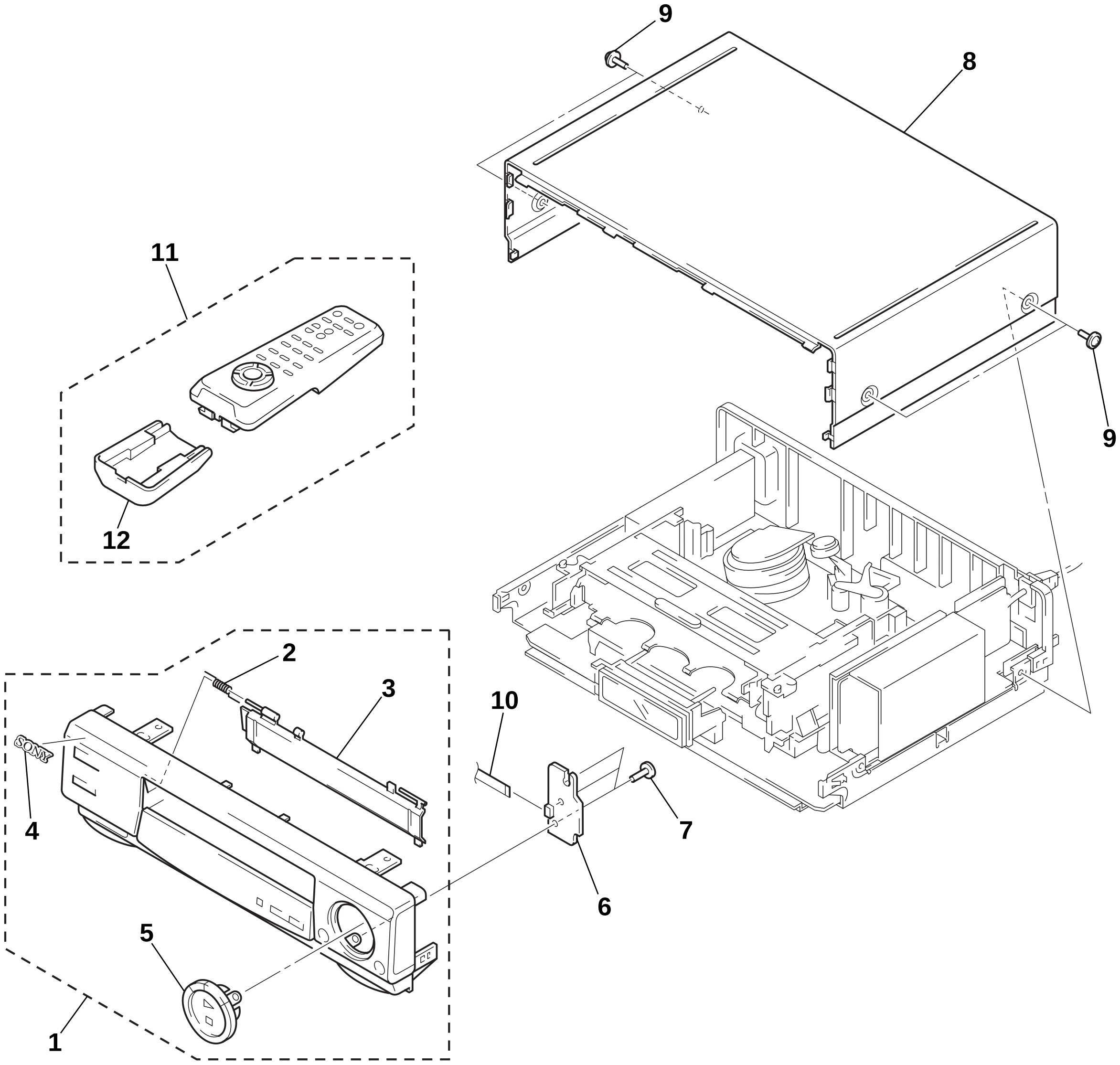
SECTION 8
REPAIR PARTS LIST

8-1. EXPLODED VIEWS

NOTE:
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of the electrical parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

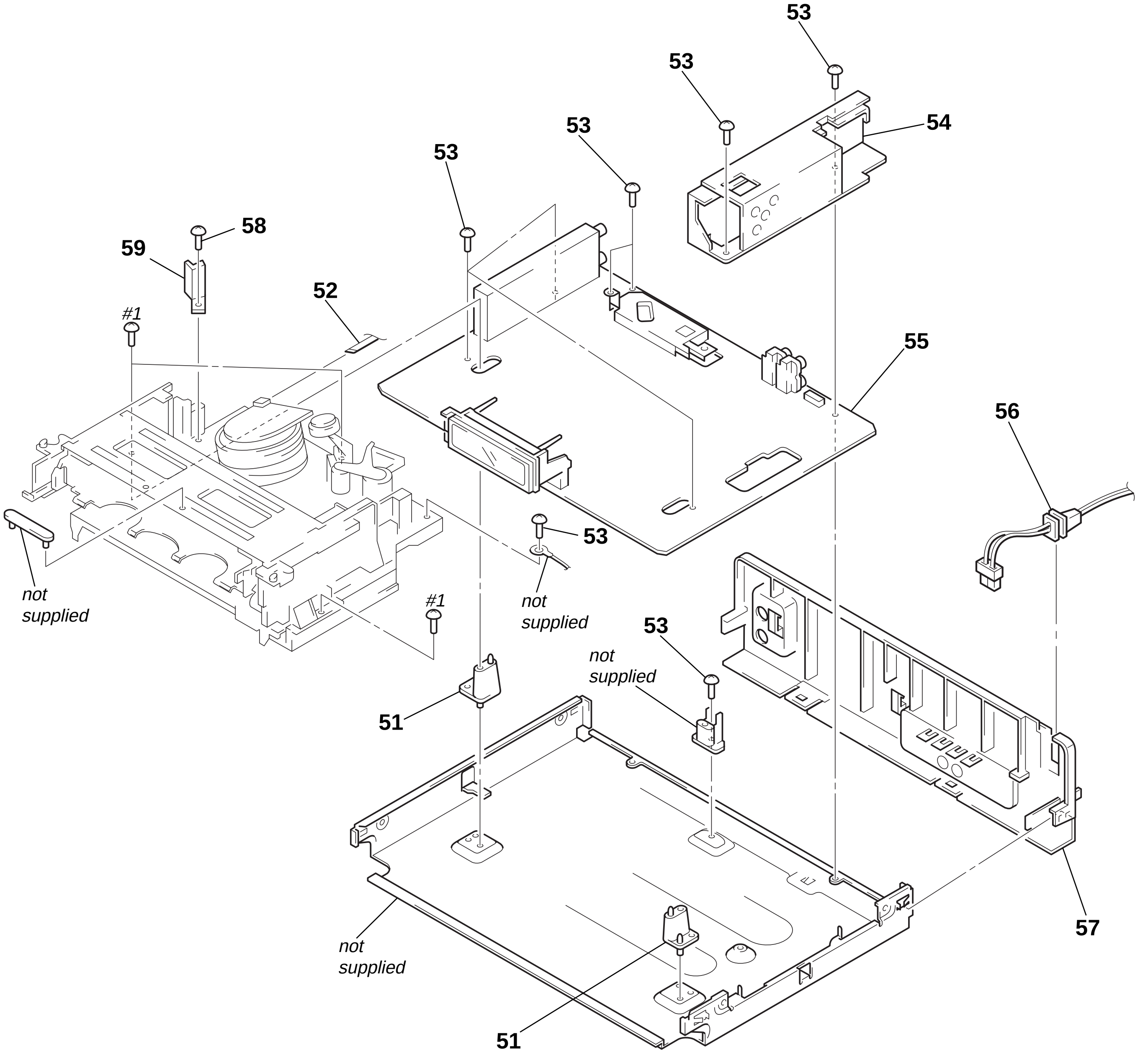
8-1-1. FRONT PANEL AND CABINET ASSEMBLIES (ED1)



Ref. No.	Part No.	Description	Remark
1	X-3948-470-1	PANEL ASSY, FRONT	
2	3-953-432-01	SPRING (GE), FL	
3	3-979-467-11	DOOR, CASSETTE	
4	3-943-995-01	EMBLEM (NO.5), SONY	
5	X-3946-598-1	BUTTON ASSY, FUNCTION	
* 6	A-6794-527-A	DS-80 MOUNT	

Ref. No.	Part No.	Description	Remark
7	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
* 8	3-988-080-51	CASE, UPPER	
9	3-710-901-11	SCREW, TAPPING	
10	1-783-567-11	CABLE, FLAT (FDS-4)	
11	1-475-613-11	COMMANDER, STANDARD (RMT-V248)	
12	3-709-322-01	COVER, BATTERY (for RMT-V248)	

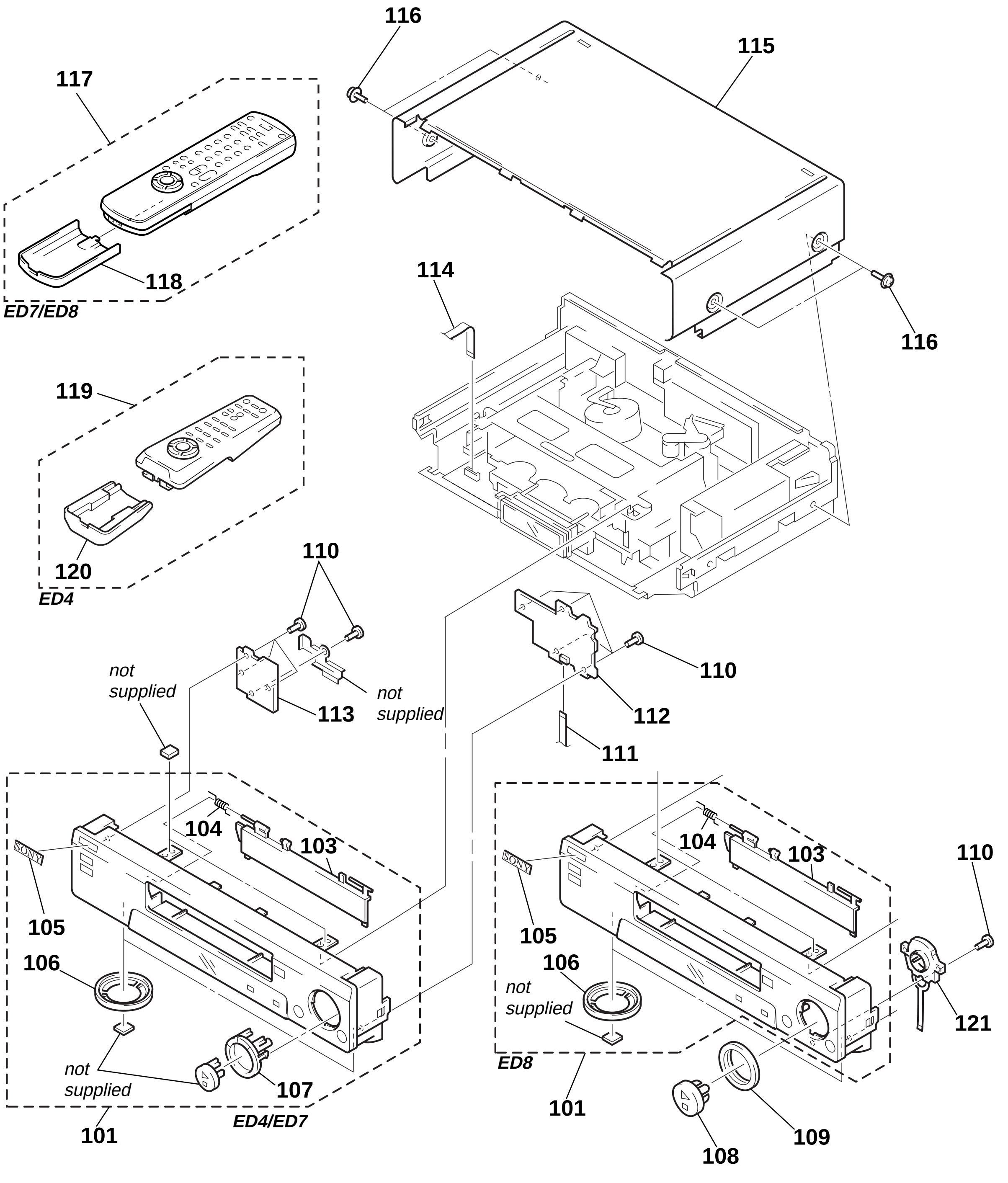
8-1-2. CHASSIS ASSEMBLY (ED1)


53
53
54
53
53
58
59
52
#1
55
56
53
not supplied
#1
not supplied
53
not supplied
51
57
not supplied
51

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 51	3-959-383-01	BASE (R), MD	
52	1-783-566-11	CABLE, FLAT (FMD-12)	
53	3-970-608-21	SUMITITE (B3), +BV	
* 54	1-468-312-11	POWER BLOCK (HS-921SF)	
* 55	A-6791-640-A	MA-323 BOARD, COMPLETE	
⚠56	1-777-854-21	CORD, POWER	
* 57	3-051-393-01	PANEL (M), REAR	
58	3-979-112-01	SCREW SW (+) BVTP 3X10	
59	X-3947-568-1	TC (N17S) ASSY	

8-1-3. FRONT PANEL AND CABINET ASSEMBLIES (ED4/ED7/ED8)

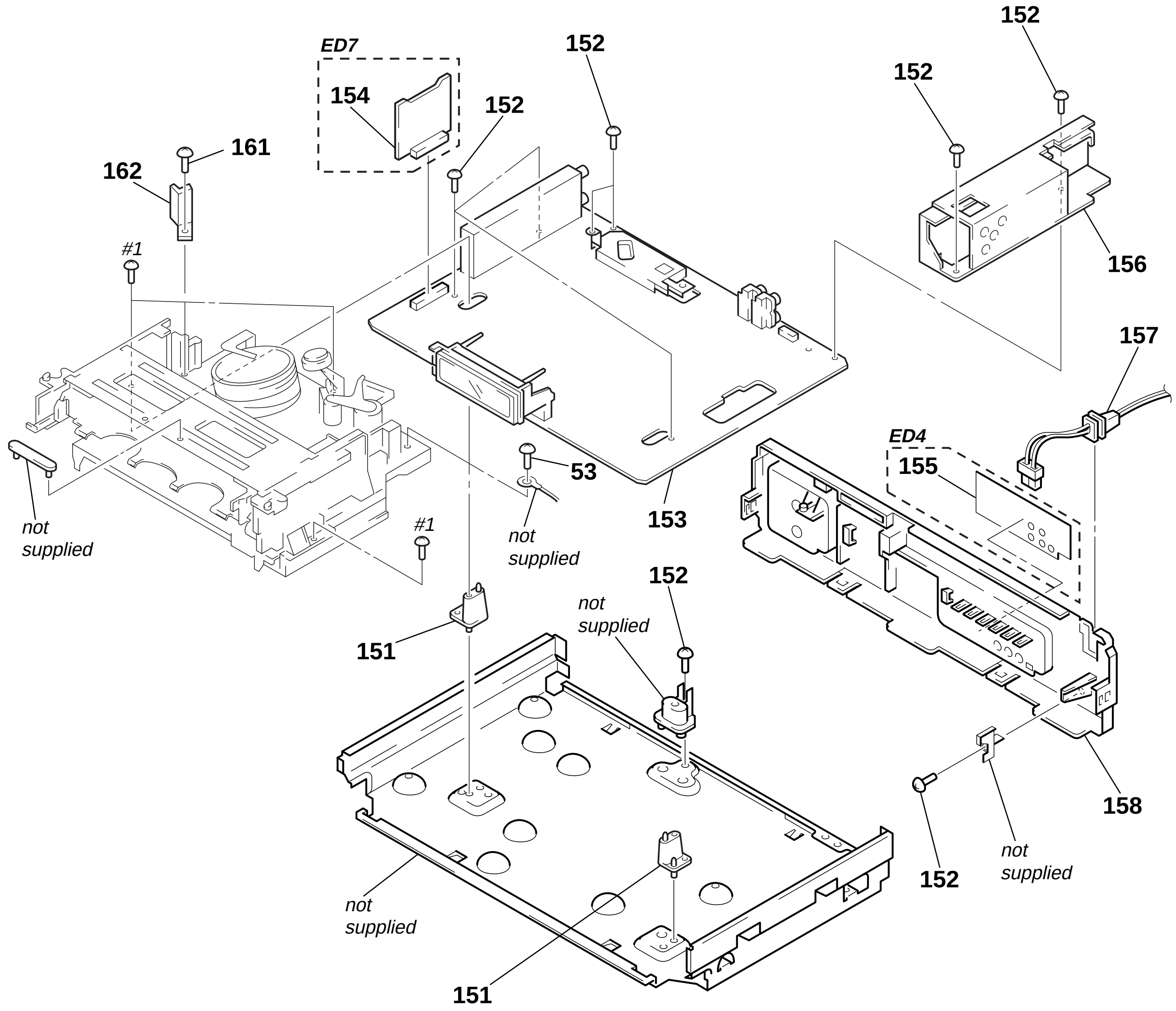


116
115
117
118
ED7/ED8
114
116
119
120
ED4
110
not supplied
110
113
not supplied
112
111
104
103
105
106
not supplied
107
101
ED4/ED7
104
103
110
105
106
not supplied
121
ED8
101
108
109

Ref. No.	Part No.	Description	Remark
101	X-3948-409-1	PANEL ASSY, FRONT (ED8)	
101	X-3948-415-1	PANEL ASSY, FRONT (ED7)	
101	X-3948-418-1	PANEL ASSY, FRONT (ED4)	
103	3-987-899-01	DOOR, CASSETTE, (P)	
104	3-953-432-01	SPRING (GE), FL	
105	3-943-995-01	EMBLEM (NO.5), SONY	
* 106	3-977-160-01	INSULATOR	
107	3-987-816-01	RING, BUTTON (ED4/ED7)	
108	3-979-309-11	BUTTON (AV), CENTER (ED8)	
109	3-988-327-01	RING (M), JOG (ED8)	
110	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
111	1-783-569-11	CABLE, FLAT (FDM-4)	

Ref. No.	Part No.	Description	Remark
* 112	A-6791-586-A	DM-76 BOARD, COMPLETE (ED8)	
* 112	A-6791-588-A	DM-76 BOARD, COMPLETE (ED4/ED7)	
* 113	A-6791-575-A	MF-312 BOARD, COMPLETE (ED4)	
* 113	A-6791-589-A	MF-312 BOARD, COMPLETE (ED7/ED8)	
114	1-783-568-11	CABLE, FLAT (FMF-23)	
115	3-710-901-11	SCREW, TAPPING	
* 116	3-977-136-21	CASE, UPPER	
117	1-475-616-31	COMMANDER, STANDARD (RMT-V247B) (ED7/ED8)	
118	3-709-133-11	COVER, BATTERY (for RMT-V247B) (ED7/ED8)	
119	1-475-613-11	COMMANDER, STANDARD (RMT-V248) (ED4)	
120	3-709-322-01	COVER, BATTERY (for RMT-V248) (ED4)	
121	1-762-844-21	SWITCH, ROTARY (ED8)	

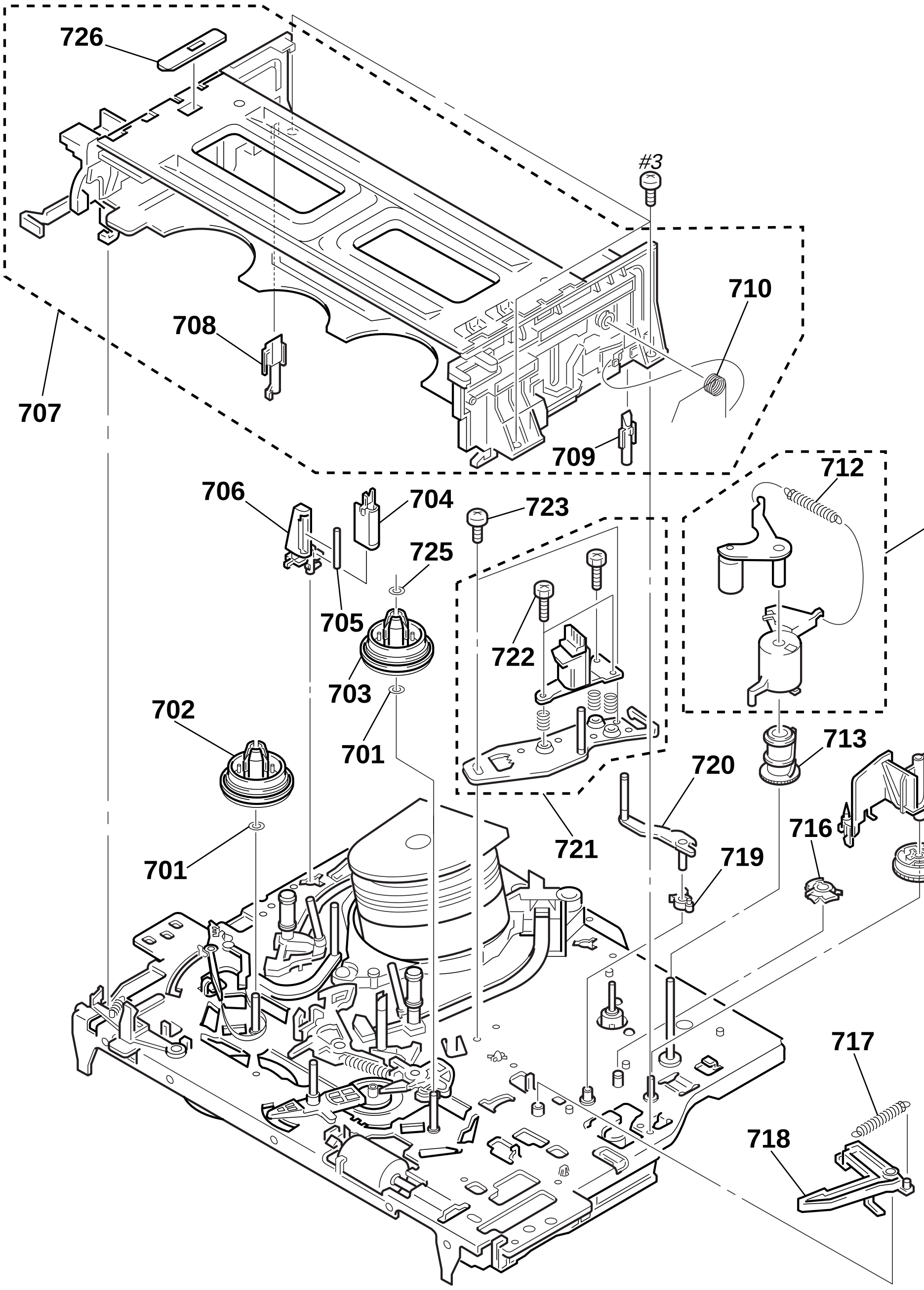
8-1-4. CHASSIS ASSEMBLY (ED4/ED7/ED8)


152
ED7
152
152
154
152
161
162
156
#1
157
ED4
155
53
153
not supplied
#1
not supplied
152
not supplied
151
158
not supplied
152
not supplied
151

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

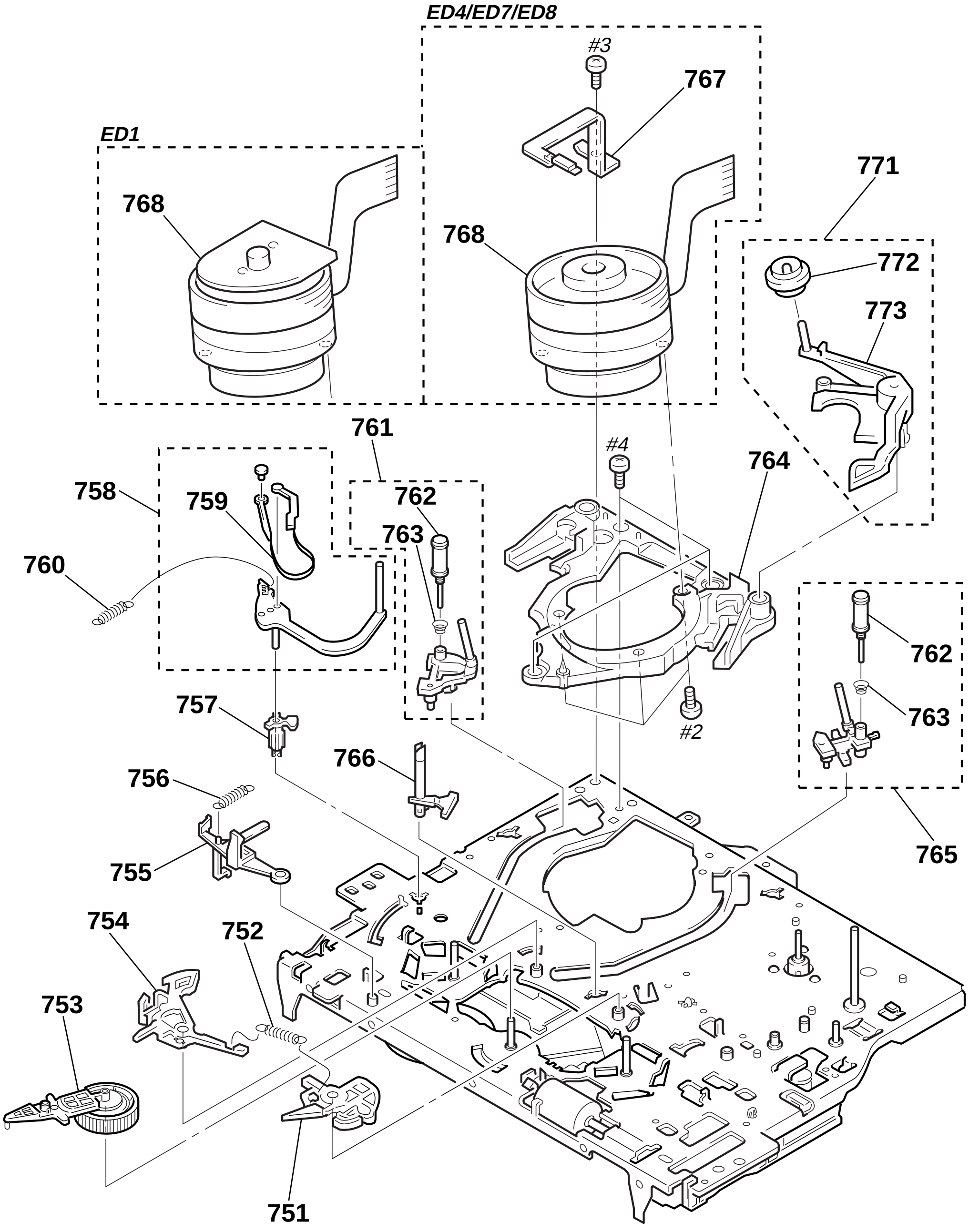
Ref. No.	Part No.	Description	Remark
* 151	3-959-383-01	BASE (R), MD	
152	3-970-608-21	SUMITITE (B3), +BV	
* 153	A-6791-629-A	MA-323 BOARD, COMPLETE (ED8)	
* 153	A-6791-677-A	MA-323 BOARD, COMPLETE (ED7)	
* 153	A-6791-678-A	MA-323 BOARD, COMPLETE (ED4)	
* 154	A-6791-591-A	NK-11 BOARD, COMPLETE (ED7)	
155	3-987-912-51	PLATE, REAR JACK A (ED4)	
156	1-468-311-21	POWER BLOCK (SR-708) (ED7/ED8)	
156	1-468-312-21	(HS-921SF1) (ED4)	
⚠157	1-777-857-22	CORD, POWER (ED4/ED8)	
⚠157	1-782-752-11	CORD, POWER (ED7)	
* 158	3-977-139-41	PANEL, REAR (ED7/ED8)	
* 158	3-977-139-71	PANEL, REAR (ED4)	
161	3-979-112-01	SCREW SW (+) BVTP 3X10	
162	X-3947-568-1	TC (N17S) ASSY	

8-1-5. MECHANISM CHASSIS ASSEMBLY (1)



Ref. No.	Part No.	Description	Remark
701	3-977-509-01	WASHER, THRUST	
702	3-977-507-01	TABLE, REEL (S)	
703	3-977-508-01	TABLE, REEL (T)	
704	1-500-144-11	HEAD, FE	
705	3-977-495-01	SHAFT TG2	
706	3-977-494-01	HOLDER, FEH	
707	A-6759-619-B	FL ASSY BOARD, COMPLETE	
708	3-977-535-01	PLATE, LUMINOUS (END SENSOR)	
709	3-977-536-01	PLATE, LUMINOUS (TOP SENSOR)	
710	3-970-471-01	SPRING (DECK OPEN), TORSION	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH	
712	3-958-455-01	SPRING (PINCH), TENSION	
713	3-977-447-01	GEAR, ELEVATOR	
714	3-977-514-01	OPENER, LID	
715	3-977-441-01	GEAR, PINCH PRESSING	
716	3-977-445-01	GEAR, TG8 ARM DRIVING	
717	3-977-465-01	SPRING, EXTENSION (RVS BRAKE)	
718	X-3947-582-1	ARM ASSY, RVS BRAKE	
719	3-977-446-01	GEAR, TG8 ARM	
720	X-3947-590-1	TG8 ASSY	
721	A-6759-620-A	HEAD BLOCK ASSY, ACE (TDK)	
722	3-974-556-01	+ HEXA TT 2.6X9 (TAPER)	
723	3-979-508-01	SCREW +HEXA TP SW 3X8	
725	3-977-443-01	WASHER, STOPPER	
726	3-987-560-02	PLATE, TOP, FL	

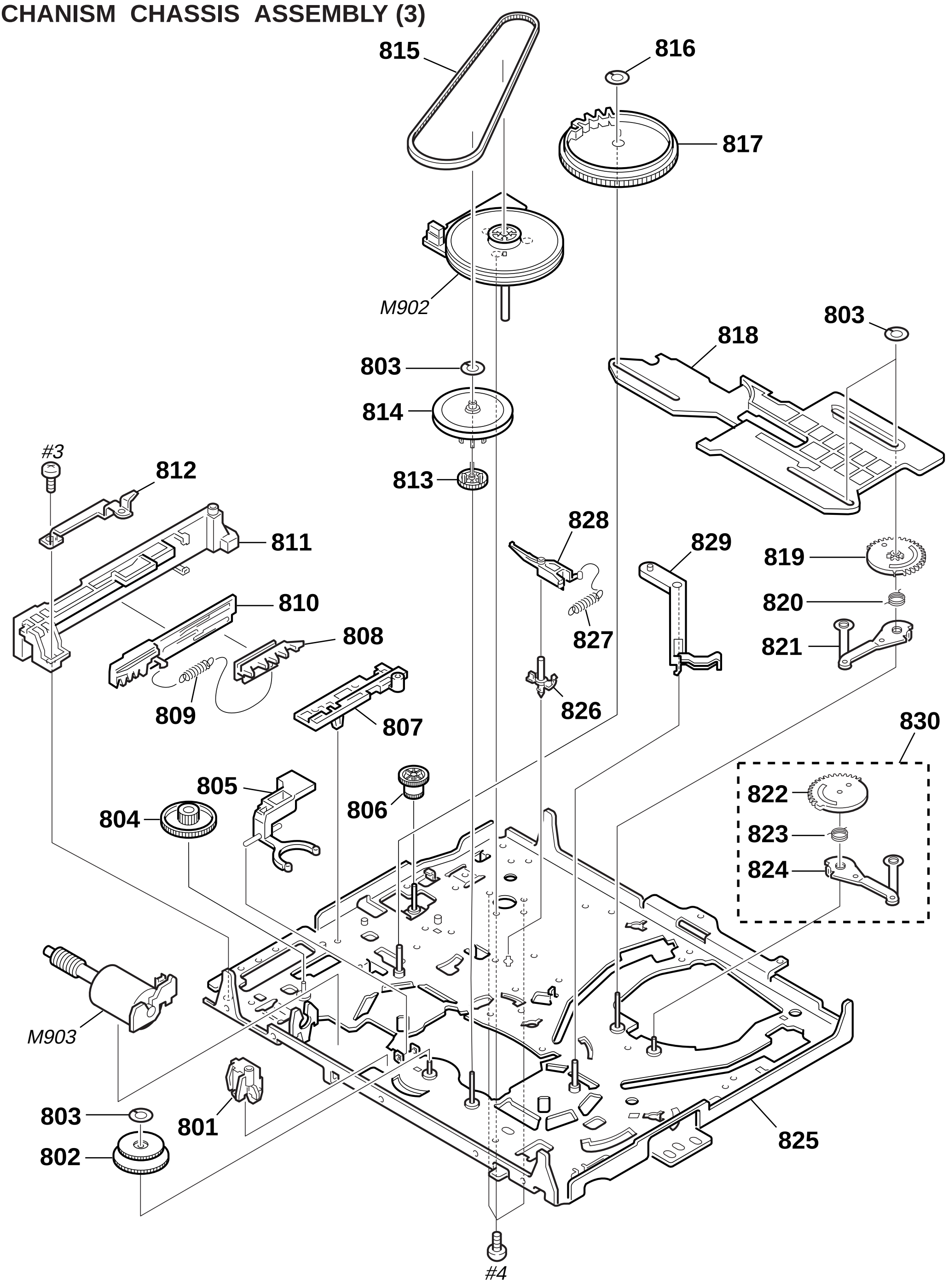
8-1-6. MECHANISM CHASSIS ASSEMBLY (2)


ED4/ED7/ED8
#3
767
ED1
768
768
771
772
773
761
764
758
759
762
763
#4
760
762
763
#2
757
766
756
765
755
754
752
753
751

Ref. No.	Part No.	Description	Remark
751	X-3947-581-1	BRAKE ASSY, MAIN (T)	
752	3-977-462-01	SPRING, EXTENTION. (MAIN BRAKE)	
753	X-3947-573-1	ARM ASSY, PENDULUM	
754	X-3947-580-2	BRAKE ASSY, MAIN (S)	
755	3-977-513-02	LEVER, REC. PROOF	
756	3-976-767-01	SPRING, TENS. (REC. PROOF)	
757	3-977-487-01	BOSS, TG1 FULCRUM	
758	X-3947-587-1	TG1 ASSY	
759	X-3947-589-1	BAND ASSY, TG1	
760	3-977-488-01	SPRING (POWER TENSION)	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY	
762	X-3944-378-1	ROLLER ASSY, GUIDE	

Ref. No.	Part No.	Description	Remark
763	3-965-178-01	SPRING	
764	3-969-632-04	BASE, DRUM	
765	A-6750-328-E	SHUTTLE (T) BLOCK ASSY	
766	3-977-501-01	PLATE, LUMINOUS	
767	X-3943-899-8	GROUND ASSY, SHAFT (ED4/ED7/ED8)	
768	1-759-455-11	DRUM ASSY, DZH-71D-R (ED1)	
768	8-839-044-02	DRUM ASSY, DZH-94A/ZRP-R (ED7/ED8)	
768	8-839-036-04	DRUM ASSY, DZH-93D/Z-RP (ED4)	
771	A-6746-074-G	ROLLER BLOCK ASSY, HC	
772	X-3947-255-1	ROLLER ASSY, HC	
773	3-975-724-07	ARM, HC	

8-1-7. MECHANISM CHASSIS ASSEMBLY (3)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Ref. No.	Part No.	Description	Remark
801	3-977-437-01	RETAINER, CAM MOTOR	
802	X-3947-584-1	ASSY, REEL DIRECT	
803	3-977-443-01	WASHER, STOPPER	
804	3-977-438-01	WORM - WHEEL	
805	3-977-506-01	ARM, LIMITTER SELECTION	
806	3-977-444-01	GEAR, PINCH TRANSMISSION	
807	3-977-515-01	GUIDE, FL SLIDER	
808	3-977-517-01	PLATE, SLIDE, FL	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)	
810	3-977-518-02	PLATE, LIMITTER, FL	
811	3-977-516-01	HOLDER, FL SLIDER	
812	3-977-877-01	PLATE, RETAINER	
813	3-977-504-01	GEAR, CLUTCH	
814	X-3947-585-1	GEAR ASSY, PULLEY	
815	3-977-510-01	BELT, RUBBER	
816	3-977-440-01	WASHER, STOPPER	
817	3-977-439-01	GEAR, CAM	
818	3-977-442-01	SLIDER	
819	3-977-455-01	GEAR, LOADING (T)	
820	3-977-456-03	SPRING, TORSION (LOAD T)	
821	X-3947-579-1	LEVER ASSY, LOADING (T)	
822	3-977-451-01	GEAR, LOADING (S)	
823	3-977-452-01	SPRING, TORSION (LOAD S)	
824	X-3947-578-1	LEVER ASSY, LOADING (S)	
825	X-3947-576-2	CHASSIS ASSY, MECHANICAL	
826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
827	3-977-467-02	SPRING, CAP BRAKE	
828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
829	3-977-489-01	ARM, TG1 DRIVING	
830	A-6759-616-A	GEAR BLOCK ASSY, LOADING (S)	
M902	1-698-971-11	MOTOR, DC (CAPSTAN)	
M903	X-3947-577-1	MOTOR ASSY, CAM	

8-2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Items marked “*” are not stocked since they are seldom required for routine service.
  Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA. . : µA. . uPA. . : µPA. .
  uPB. . : µPB. . uPC. . : µPC. .
  uPD. . : µPD. .
- CAPACITORS
  uF: µF
- COILS
  uH: µH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	A-6791-586-A	DM-76 BOARD, COMPLETE (ED8)			
*	A-6791-588-A	DM-76 BOARD, COMPLETE (ED4/ED7)			
		**********************			
					(Ref.No.1,000 Series)
		< CONNECTOR >			
CN451	1-774-471-41	CONNECTOR, FFC/FPC 5P (ED8)			
CN452	1-691-066-21	HOUSING, CONNECTOR 7P			
		< RESISTOR >			
R442	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R443	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R444	1-216-295-00	METAL CHIP	0	5%	1/10W
R445	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R446	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R447	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
		< SWITCH >			
S441	1-762-196-21	SWITCH, TACTILE (EJECT)			
S442	1-762-196-21	SWITCH, TACTILE (REW) (ED8)			
S443	1-762-196-21	SWITCH, TACTILE (FF) (ED8)			
S444	1-762-196-21	SWITCH, TACTILE (PAUSE)			
S445	1-762-196-21	SWITCH, TACTILE (REC)			
S447	1-762-196-21	SWITCH, TACTILE (REW) (ED4/ED7)			
S448	1-762-196-21	SWITCH, TACTILE (FF) (ED4/ED7)			
S449	1-762-196-21	SWITCH, TACTILE (STOP) (ED4/ED7)			
S450	1-762-196-21	SWITCH, TACTILE (PLAY) (ED4/ED7)			
*	A-6794-527-A	DS-80 BOARD, COMPLETE (ED1)			
		*********************			
					(Ref.No.2,000 Series)
		< CONNECTOR >			
CN452	1-691-066-21	HOUSING, CONNECTOR 7P			
		< RESISTOR >			
R451	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R452	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R453	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
		< SWITCH >			
S450	1-571-977-11	SWITCH, TACTILE (FF)			
S452	1-571-977-11	SWITCH, TACTILE (PLAY)			
S453	1-571-977-11	SWITCH, TACTILE (STOP)			
S455	1-571-977-11	SWITCH, TACTILE (REW)			
*	A-6791-629-A	MA-323 BOARD, COMPLETE (ED8)			
*	A-6791-677-A	MA-323 BOARD, COMPLETE (ED7)			
*	A-6791-678-A	MA-323 BOARD, COMPLETE (ED4)			
*	A-6791-640-A	MA-323 BOARD, COMPLETE (ED1)			
		**********************			
					(Ref.No.2,000 Series)
*	3-960-273-01	SPACER, TOP END			
*	3-960-274-01	SPACER, LED			
*	3-966-865-01	BASE, INDICATION TUBE			
		< CAPACITOR >			
C100	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C101	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C102	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C103	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C104	1-128-057-11	ELECT	330uF	20%	6.3V
C106	1-124-589-11	ELECT	47uF	20%	16V
C108	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C109	1-124-589-11	ELECT	47uF	20%	16V
C111	1-124-589-11	ELECT	47uF	20%	16V
					(ED1)
C112	1-104-905-11	CAPACITOR	0.22F		5.5V
C113	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C114	1-124-248-00	ELECT	22uF	20%	35V
C115	1-126-157-11	ELECT	10uF	20%	16V
C116	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C117	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C119	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
					(ED7/ED8)
C120	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C121	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C122	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C123	1-126-925-11	ELECT	470uF	20%	10V
C124	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C125	1-124-589-11	ELECT	47uF	20%	16V
C126	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C127	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
					(ED1)
C128	1-117-720-11	CERAMIC CHIP	4.7uF		10V

Ref. No.	Part No.	Description			Remark
C129	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C131	1-128-499-11	ELECT	220uF	20%	16V
C133	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C134	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C136	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C137	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C138	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C139	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C142	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C171	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C172	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C173	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C174	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C175	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C176	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C177	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C178	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C180	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C182	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C185	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C200	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C201	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C203	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C204	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
C205	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C206	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C207	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C208	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C209	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C210	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C212	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C213	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C214	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C215	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C216	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C217	1-163-089-00	CERAMIC CHIP	6PF		50V
C218	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C219	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C220	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C221	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C222	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C223	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C224	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C225	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C226	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
C227	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C228	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C229	1-163-089-00	CERAMIC CHIP	6PF		50V (ED4/ED7/ED8)
C230	1-163-229-11	CERAMIC CHIP	12PF	5%	50V (ED4/ED7/ED8)
C230	1-163-231-11	CERAMIC CHIP	15PF	5%	50V (ED1)
C231	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C232	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C233	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C234	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C235	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C236	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C237	1-126-157-11	ELECT	10uF	20%	16V
C238	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C239	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C240	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C241	1-126-157-11	ELECT	10uF	20%	16V
C242	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C243	1-126-157-11	ELECT	10uF	20%	16V
C244	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C245	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C246	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C248	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C249	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C250	1-126-157-11	ELECT	10uF	20%	16V
C251	1-126-157-11	ELECT	10uF	20%	16V
C252	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C253	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C254	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C256	1-163-249-11	CERAMIC CHIP	82PF	5%	50V (ED4/ED7/ED8)
C256	1-163-251-11	CERAMIC CHIP	100PF	5%	50V (ED1)
C257	1-163-087-00	CERAMIC CHIP	4PF		50V
C258	1-163-222-11	CERAMIC CHIP	5PF	0.25PF	50V
C259	1-164-232-11	CERAMIC CHIP	0.01uF		50V (ED7/ED8)
C261	1-164-232-11	CERAMIC CHIP	0.01uF		50V (ED7/ED8)
C262	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C263	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C264	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C265	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C266	1-117-720-11	CERAMIC CHIP	4.7uF		10V (ED7/ED8)
C302	1-126-157-11	ELECT	10uF	20%	16V
C304	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C305	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C306	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C307	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C308	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C309	1-126-157-11	ELECT	10uF	20%	16V
C310	1-126-157-11	ELECT	10uF	20%	16V
C311	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C312	1-137-370-11	FILM	0.01uF	5%	50V
C313	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C314	1-124-589-11	ELECT	47uF	20%	16V
C315	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C316	1-126-160-11	ELECT	1uF	20%	50V
C318	1-126-163-11	ELECT	4.7uF	20%	50V
C319	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C321	1-124-248-00	ELECT	22uF	20%	35V
C322	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C323	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C324	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C325	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C331	1-104-697-11	FILM	0.047uF	5%	100V (ED7/ED8)
C332	1-164-232-11	CERAMIC CHIP	0.01uF		50V (ED7/ED8)
C333	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V (ED7/ED8)

MA-323

Ref. No.	Part No.	Description			Remark
C335	1-126-933-11	ELECT	100uF	20%	16V (ED7/ED8)
C336	1-124-589-11	ELECT	47uF	20%	16V
C337	1-137-612-11	FILM	0.0068uF	5%	100V (ED7/ED8)
C337	1-104-696-11	FILM	0.015uF	5%	100V (ED1/ED4)
C338	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C339	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C340	1-164-232-11	CERAMIC CHIP	0.01uF		50V (ED7/ED8)
C342	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V (ED7/ED8)
C346	1-117-720-11	CERAMIC CHIP	4.7uF		10V (ED7/ED8)
C350	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V (ED7/ED8)
C352	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (ED7/ED8)
C353	1-163-038-00	CERAMIC CHIP	0.1uF		25V (ED7/ED8)
C357	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (ED7/ED8)
C358	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V (ED7/ED8)
C359	1-164-232-11	CERAMIC CHIP	0.01uF		50V (ED7/ED8)
C361	1-109-982-11	CERAMIC CHIP	1uF	10%	10V (ED7/ED8)
C362	1-109-982-11	CERAMIC CHIP	1uF	10%	10V (ED7/ED8)
C363	1-216-296-00	METAL CHIP	0	5%	1/8W (ED7/ED8)
C364	1-216-296-00	METAL CHIP	0	5%	1/8W (ED7/ED8)
C365	1-135-091-00	TANTALUM CHIP	1uF	20%	16V (ED7/ED8)
C366	1-135-091-00	TANTALUM CHIP	1uF	20%	16V (ED7/ED8)
C369	1-104-913-11	TANTAL. CHIP	10uF	20%	16V (ED7/ED8)
C370	1-104-913-11	TANTAL. CHIP	10uF	20%	16V (ED7/ED8)
C371	1-135-091-00	TANTALUM CHIP	1uF	20%	16V (ED7/ED8)
C372	1-104-913-11	TANTAL. CHIP	10uF	20%	16V (ED7/ED8)
C373	1-104-913-11	TANTAL. CHIP	10uF	20%	16V (ED7/ED8)
C374	1-135-091-00	TANTALUM CHIP	1uF	20%	16V (ED7/ED8)
C375	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V (ED7/ED8)
C376	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V (ED7/ED8)
C377	1-124-589-11	ELECT	47uF	20%	16V (ED7/ED8)
C378	1-104-913-11	TANTAL. CHIP	10uF	20%	16V (ED7/ED8)
C379	1-135-179-21	TANTAL. CHIP	2.2uF	20%	16V (ED7/ED8)

Ref. No.	Part No.	Description			Remark
C380	1-104-913-11	TANTAL. CHIP	10uF	20%	16V (ED7/ED8)
C381	1-124-589-11	ELECT	47uF	20%	16V (ED7/ED8)
C382	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V (ED7/ED8)
C383	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V (ED7/ED8)
C384	1-164-505-11	CERAMIC CHIP	2.2uF		16V (ED7/ED8)
C385	1-124-589-11	ELECT	47uF	20%	16V (ED7/ED8)
C386	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED7/ED8)
C391	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED7/ED8)
C400	1-164-232-11	CERAMIC CHIP	0.01uF		50V (ED1)
C401	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C402	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C403	1-126-163-11	ELECT	4.7uF	20%	50V
C404	1-126-157-11	ELECT	10uF	20%	16V
C405	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C406	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C407	1-126-163-11	ELECT	4.7uF	20%	50V
C408	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C409	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C411	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C412	1-163-224-11	CERAMIC CHIP	7PF	0.25PF	50V
C417	1-124-589-11	ELECT	47uF	20%	16V
C419	1-163-245-11	CERAMIC CHIP	56PF	5%	50V
C421	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C422	1-124-589-11	ELECT	47uF	20%	16V
C423	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C424	1-124-589-11	ELECT	47uF	20%	16V
C501	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C504	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED4/ED7/ED8)
C505	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C506	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C507	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C508	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C509	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C510	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C511	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C512	1-163-235-11	CERAMIC CHIP	22PF	5%	50V (ED4/ED7/ED8)
C512	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED1)
C513	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C514	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED4/ED7/ED8)
C515	1-163-235-11	CERAMIC CHIP	22PF	5%	50V (ED4/ED7/ED8)
C515	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED1)
C516	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED4/ED7/ED8)
C517	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED4/ED7/ED8)

Ref. No.	Part No.	Description			Remark
C518	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C519	1-124-584-00	ELECT	100uF	20%	10V
C520	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C521	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C522	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C523	1-124-584-00	ELECT	100uF	20%	10V
C524	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C526	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C527	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C529	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C600	1-126-163-11	ELECT	4.7uF	20%	50V
C601	1-124-248-00	ELECT	22uF	20%	35V
C602	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C603	1-124-589-11	ELECT	47uF	20%	16V
C604	1-124-589-11	ELECT	47uF	20%	16V
C606	1-124-589-11	ELECT	47uF	20%	16V
C608	1-124-584-00	ELECT	100uF	20%	10V
C609	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C612	1-104-664-11	ELECT	47uF	20%	16V
C613	1-104-664-11	ELECT	47uF	20%	16V
C614	1-124-589-11	ELECT	47uF	20%	16V
C701	1-126-933-11	ELECT	100uF	20%	16V
C702	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C703	1-104-664-11	ELECT	47uF	20%	16V
C704	1-126-933-11	ELECT	100uF	20%	16V
C705	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C706	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C708	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V (ED7/ED8)
C710	1-126-963-11	ELECT	4.7uF	20%	50V
C712	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C713	1-126-933-11	ELECT	100uF	20%	16V
C714	1-126-933-11	ELECT	100uF	20%	16V
C715	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C716	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C717	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C718	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C719	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C721	1-126-767-11	ELECT	1000uF	20%	16V
C752	1-109-982-11	CERAMIC CHIP	1uF	10%	10V (ED1/ED4/ED8)
C753	1-104-664-11	ELECT	47uF	20%	16V (ED7/ED8)
C756	1-126-964-11	ELECT	10uF	20%	50V (ED8)
C757	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V (ED1/ED4)
C758	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V (ED1/ED4)
C902	1-126-935-11	ELECT	470uF	20%	6.3V
C904	1-104-664-11	ELECT	47uF	20%	16V
C906	1-126-160-11	ELECT	1uF	20%	50V
C907	1-126-160-11	ELECT	1uF	20%	50V (ED7/ED8)
C908	1-126-160-11	ELECT	1uF	20%	50V
C909	1-126-160-11	ELECT	1uF	20%	50V (ED7/ED8)
C911	1-126-934-11	ELECT	220uF	20%	16V (ED7/ED8)
C911	1-124-589-11	ELECT	47uF	20%	16V (ED1/ED4)

Ref. No.	Part No.	Description	Remark
		< CONNECTOR >	
* CN101	1-568-954-11	PIN, CONNECTOR 5P (ED4/ED7/ED8)	
CN102	1-779-723-11	CONNECTOR, BOARD TO BOARD 9P	
* CN103	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P	
CN104	1-784-486-11	CONNECTOR, FFC/FPC 7P (ED1)	
CN105	1-784-484-11	CONNECTOR, FFC/FPC 5P (ED4/ED7/ED8)	
CN161	1-506-468-11	PIN, CONNECTOR 3P	
CN301	1-506-469-11	PIN, CONNECTOR 4P	
CN302	1-506-468-11	PIN, CONNECTOR 3P	
* CN341	1-560-890-00	PIN, CONNECTOR 2P (ED7/ED8)	
CN423	1-766-278-11	PIN, CONNECTOR (PC BOARD) 5P (ED7/ED8)	
CN424	1-784-486-11	CONNECTOR, FFC/FPC 7P	
* CN501	1-560-892-00	PIN, CONNECTOR 4P	
CN502	1-784-492-11	CONNECTOR, FFC/FPC 13P (ED7/ED8)	
CN502	1-563-585-11	CONNECTOR, FLEXIBLE 8P (ED1/ED4)	
* CN600	1-568-936-11	PIN, CONNECTOR 9P (ED4/ED7/ED8)	
CN600	1-784-946-11	CONNECTOR, BOARD TO BOARD 9P (ED1)	
CN751	1-691-170-11	PIN, CONNECTOR 13P (ED7)	
		< JACK >	
CNJ901	1-779-011-11	JACK, PIN 6P (LINE-1 IN/LINE OUT)	(ED7/ED8)
CNJ901	1-779-010-11	JACK, PIN 4P (LINE-1 IN/LINE OUT)	(ED1/ED4)
		< DIODE >	
D102	8-719-048-26	DIODE GL528V1	
D103	8-719-200-82	DIODE 11ES2	
D104	8-719-200-82	DIODE 11ES2	
D105	8-719-054-09	DIODE MPG5304S (POWER) (ED1)	
D106	8-719-911-19	DIODE 1SS119	
D130	8-719-200-82	DIODE 11ES2	
D163	8-719-200-82	DIODE 11ES2	
D164	8-719-200-82	DIODE 11ES2	
D165	8-719-200-82	DIODE 11ES2	
D305	8-719-109-93	DIODE RD6.2ES-B2	
D306	8-719-109-93	DIODE RD6.2ES-B2	
D307	8-719-109-93	DIODE RD6.2ES-B2	
D401	8-719-109-93	DIODE RD6.2ES-B2	
D402	8-719-911-19	DIODE 1SS119	
D403	8-719-911-19	DIODE 1SS119	
D600	8-719-911-19	DIODE 1SS119	
D601	8-719-911-19	DIODE 1SS119	
D602	8-719-109-84	DIODE RD5.1ES-B1	
D603	8-719-200-82	DIODE 11ES2	
D604	8-719-200-82	DIODE 11ES2	
D701	8-719-109-84	DIODE RD5.1ES-B1	
D702	8-719-911-19	DIODE 1SS119	
D704	8-719-150-92	DIODE RD33ES-T1B	
D908	8-719-109-93	DIODE RD6.2ES-B2	
D909	8-719-109-93	DIODE RD6.2ES-B2	
		< FERRITE BEAD >	
FB701	1-410-397-21	FERRITE BEAD INDUCTOR	
		< IC >	
IC130	8-759-481-46	IC LB1943	
IC161	8-759-532-55	IC HD6433977RA58F	
IC162	8-759-248-87	IC MM1256XF-BE	
IC163	8-759-432-32	IC ST24W02FM6TR	

MA-323

Ref. No.	Part No.	Description	Remark
IC201	8-759-562-55	IC HA118503F	
IC202	8-759-479-53	IC MSM7470-76MS-KR1	
IC203	8-759-295-66	IC BA7653AF-E2 (ED7/ED8)	
IC340	8-759-486-92	IC LA7256 (ED7/ED8)	
IC360	8-759-486-64	IC TDA9615H/N1,557 (ED7/ED8)	
IC400	8-742-042-00	HYB IC SBX1986-51 (ED1)	
IC420	8-759-366-44	IC uPD16312GB-3B4	
IC501	8-759-352-17	IC HA118195NT (ED4/ED7/ED8)	
IC501	8-759-357-84	IC HA118295NT (ED1)	
IC600	8-759-438-18	IC PQ12RD08	
IC601	8-759-701-56	IC NJM78M05FA	
IC602	8-759-358-38	IC NJM78M05DLA(TE1)	
IC750	8-742-037-00	HYB IC SBX1837-51 (ED8)	
IC901	8-759-454-62	IC uPC4558G2-E2	
		< JUMPER RESISTOR >	
JR001	1-216-295-00	METAL CHIP 0 5%	1/10W
JR002	1-216-295-00	METAL CHIP 0 5%	1/10W
JR003	1-216-295-00	METAL CHIP 0 5%	1/10W
JR004	1-216-295-00	METAL CHIP 0 5%	1/10W
JR005	1-216-295-00	METAL CHIP 0 5%	1/10W
JR006	1-216-295-00	METAL CHIP 0 5%	1/10W
JR007	1-216-295-00	METAL CHIP 0 5%	1/10W
JR008	1-216-295-00	METAL CHIP 0 5%	1/10W
JR009	1-216-295-00	METAL CHIP 0 5%	1/10W
JR010	1-216-295-00	METAL CHIP 0 5%	1/10W
JR011	1-216-295-00	METAL CHIP 0 5%	1/10W
JR012	1-216-295-00	METAL CHIP 0 5%	1/10W
JR013	1-216-295-00	METAL CHIP 0 5%	1/10W
JR014	1-216-295-00	METAL CHIP 0 5%	1/10W
JR015	1-216-295-00	METAL CHIP 0 5%	1/10W
JR016	1-216-295-00	METAL CHIP 0 5%	1/10W
JR018	1-216-295-00	METAL CHIP 0 5%	1/10W
JR019	1-216-295-00	METAL CHIP 0 5%	1/10W
JR020	1-216-295-00	METAL CHIP 0 5%	1/10W
JR021	1-216-295-00	METAL CHIP 0 5%	1/10W
JR022	1-216-295-00	METAL CHIP 0 5%	1/10W
JR023	1-216-295-00	METAL CHIP 0 5%	1/10W
JR024	1-216-295-00	METAL CHIP 0 5%	1/10W
JR025	1-216-295-00	METAL CHIP 0 5%	1/10W
JR026	1-216-295-00	METAL CHIP 0 5%	1/10W
JR027	1-216-295-00	METAL CHIP 0 5%	1/10W
JR028	1-216-295-00	METAL CHIP 0 5%	1/10W
JR029	1-216-295-00	METAL CHIP 0 5%	1/10W
JR030	1-216-295-00	METAL CHIP 0 5%	1/10W
JR031	1-216-295-00	METAL CHIP 0 5%	1/10W
JR032	1-216-295-00	METAL CHIP 0 5%	1/10W
JR033	1-216-295-00	METAL CHIP 0 5%	1/10W
JR201	1-216-296-00	METAL CHIP 0 5%	1/8W
JR202	1-216-296-00	METAL CHIP 0 5%	1/8W
JR203	1-216-296-00	METAL CHIP 0 5%	1/8W
JR204	1-216-296-00	METAL CHIP 0 5%	1/8W
JR205	1-216-296-00	METAL CHIP 0 5%	1/8W
JR206	1-216-296-00	METAL CHIP 0 5%	1/8W
JR207	1-216-296-00	METAL CHIP 0 5%	1/8W
JR208	1-216-296-00	METAL CHIP 0 5%	1/8W
JR209	1-216-296-00	METAL CHIP 0 5%	1/8W
JR210	1-216-296-00	METAL CHIP 0 5%	1/8W
JR211	1-216-296-00	METAL CHIP 0 5%	1/8W
JR212	1-216-296-00	METAL CHIP 0 5%	1/8W
JR213	1-216-296-00	METAL CHIP 0 5%	1/8W
JR214	1-216-296-00	METAL CHIP 0 5%	1/8W
JR215	1-216-296-00	METAL CHIP 0 5%	1/8W
JR216	1-216-296-00	METAL CHIP 0 5%	1/8W
JR217	1-216-296-00	METAL CHIP 0 5%	1/8W
JR218	1-216-296-00	METAL CHIP 0 5%	1/8W
JR219	1-216-296-00	METAL CHIP 0 5%	1/8W
JR220	1-216-296-00	METAL CHIP 0 5%	1/8W
JR221	1-216-296-00	METAL CHIP 0 5%	1/8W
JR222	1-216-296-00	METAL CHIP 0 5%	1/8W
JR223	1-216-296-00	METAL CHIP 0 5%	1/8W
JR224	1-216-296-00	METAL CHIP 0 5%	1/8W
JR225	1-216-296-00	METAL CHIP 0 5%	1/8W
JR226	1-216-296-00	METAL CHIP 0 5%	1/8W
JR227	1-216-296-00	METAL CHIP 0 5%	1/8W
JR228	1-216-296-00	METAL CHIP 0 5%	1/8W
JR229	1-216-296-00	METAL CHIP 0 5%	1/8W
JR230	1-216-296-00	METAL CHIP 0 5%	1/8W
JR231	1-216-296-00	METAL CHIP 0 5%	1/8W
JR232	1-216-296-00	METAL CHIP 0 5%	1/8W
JR233	1-216-296-00	METAL CHIP 0 5%	1/8W
JR234	1-216-296-00	METAL CHIP 0 5%	1/8W
JR235	1-216-296-00	METAL CHIP 0 5%	1/8W
JR236	1-216-296-00	METAL CHIP 0 5%	1/8W
JR237	1-216-296-00	METAL CHIP 0 5%	1/8W
JR238	1-216-296-00	METAL CHIP 0 5%	1/8W
JR239	1-216-296-00	METAL CHIP 0 5%	1/8W
JR240	1-216-296-00	METAL CHIP 0 5%	1/8W
JR241	1-216-296-00	METAL CHIP 0 5%	1/8W
JR242	1-216-296-00	METAL CHIP 0 5%	1/8W
JR243	1-216-296-00	METAL CHIP 0 5%	1/8W
JR244	1-216-296-00	METAL CHIP 0 5%	1/8W
JR245	1-216-296-00	METAL CHIP 0 5%	1/8W
JR246	1-216-296-00	METAL CHIP 0 5%	1/8W
JR247	1-216-296-00	METAL CHIP 0 5%	1/8W
JR248	1-216-296-00	METAL CHIP 0 5%	1/8W
JR249	1-216-296-00	METAL CHIP 0 5%	1/8W
JR250	1-216-296-00	METAL CHIP 0 5%	1/8W
JR251	1-216-296-00	METAL CHIP 0 5%	1/8W
JR252	1-216-296-00	METAL CHIP 0 5%	1/8W
JR253	1-216-296-00	METAL CHIP 0 5%	1/8W
JS104	1-216-295-00	METAL CHIP 0 5%	1/10W
JS107	1-216-295-00	METAL CHIP 0 5%	1/10W
JS108	1-216-295-00	METAL CHIP 0 5%	1/10W
JS109	1-216-296-00	METAL CHIP 0 5%	1/8W
JS201	1-216-295-00	METAL CHIP 0 5%	1/10W (ED1/ED4)
JS202	1-216-295-00	METAL CHIP 0 5%	1/10W
JS204	1-216-295-00	METAL CHIP 0 5%	1/10W
JS302	1-216-295-00	METAL CHIP 0 5%	1/10W (ED1/ED4)
JS304	1-216-295-00	METAL CHIP 0 5%	1/10W (ED7/ED8)
JS309	1-216-295-00	METAL CHIP 0 5%	1/10W
JS360	1-216-296-00	METAL CHIP 0 5%	1/8W (ED1/ED4)
JS364	1-216-296-00	METAL CHIP 0 5%	1/8W (ED1/ED4)
JS400	1-216-295-00	METAL CHIP 0 5%	1/10W
JS401	1-216-295-00	METAL CHIP 0 5%	1/10W

Ref. No.	Part No.	Description	Remark
JS404	1-216-295-00	METAL CHIP 0 5%	1/10W (ED4/ED7/ED8)
JS603	1-216-296-00	METAL CHIP 0 5%	1/8W
JS604	1-216-296-00	METAL CHIP 0 5%	1/8W
JS705	1-216-296-00	METAL CHIP 0 5%	1/8W
JS707	1-216-296-00	METAL CHIP 0 5%	1/8W
JS708	1-216-295-00	METAL CHIP 0 5%	1/10W (ED1/ED4/ED8)
JS709	1-216-296-00	METAL CHIP 0 5%	1/8W
JS713	1-216-295-00	METAL CHIP 0 5%	1/10W
JS716	1-216-296-00	METAL CHIP 0 5%	1/8W (ED7/ED8)
JS719	1-216-295-00	METAL CHIP 0 5%	1/10W (ED1/ED4)
JS752	1-216-295-00	METAL CHIP 0 5%	1/10W (ED8)
JS754	1-216-295-00	METAL CHIP 0 5%	1/10W (ED8)
JS756	1-216-075-00	METAL CHIP 12K 5%	1/10W (ED8)
JS756	1-216-295-00	METAL CHIP 0 5%	1/10W (ED7)
JS758	1-216-295-00	METAL CHIP 0 5%	1/10W (ED7)
JS759	1-216-295-00	METAL CHIP 0 5%	1/10W (ED7)
JS760	1-216-295-00	METAL CHIP 0 5%	1/10W (ED7)
JS763	1-216-295-00	METAL CHIP 0 5%	1/10W (ED7)
JS764	1-216-295-00	METAL CHIP 0 5%	1/10W (ED7)
JS900	1-216-295-00	METAL CHIP 0 5%	1/10W
JS912	8-719-911-19	DIODE 1SS119 (ED7/ED8)	
		< COIL >	
L164	1-410-513-11	INDUCTOR 22uH (ED1)	
L166	1-410-513-11	INDUCTOR 22uH	
L167	1-410-501-11	INDUCTOR 2.2uH	
L168	1-410-513-11	INDUCTOR 22uH	
L203	1-410-525-11	INDUCTOR 220uH	
L204	1-410-501-11	INDUCTOR 2.2uH	
L205	1-410-510-11	INDUCTOR 12uH	
L207	1-410-509-11	INDUCTOR 10uH	
L208	1-410-520-11	INDUCTOR 82uH	
L209	1-410-521-11	INDUCTOR 100uH	
L211	1-414-939-21	INDUCTOR 68uH	
L212	1-410-521-11	INDUCTOR 100uH	
L213	1-410-525-11	INDUCTOR 220uH	
L301	1-412-092-11	INDUCTOR 22mH	
L302	1-410-456-21	INDUCTOR 12mH	
L303	1-410-687-11	INDUCTOR 1.2mH	
L330	1-410-120-11	INDUCTOR 1.2mH (ED7/ED8)	
L341	1-414-940-21	INDUCTOR 100uH (ED7/ED8)	
L400	1-410-511-11	INDUCTOR 15uH	
L401	1-410-513-11	INDUCTOR 22uH	
L501	1-414-940-21	INDUCTOR 100uH	
L502	1-414-940-21	INDUCTOR 100uH	
L600	1-414-938-21	INDUCTOR 47uH	
L601	1-410-509-11	INDUCTOR 10uH	
L602	1-410-513-11	INDUCTOR 22uH	
L701	1-410-501-11	INDUCTOR 2.2uH	
L703	1-410-501-11	INDUCTOR 2.2uH	
L704	1-410-501-11	INDUCTOR 2.2uH	
L706	1-414-938-21	INDUCTOR 47uH	
L751	1-410-509-11	INDUCTOR 10uH (ED7/ED8)	
		< FLUORECENT INDICATOR >	
ND420	1-517-734-11	TUBE, FLUORESCENT INDICATOR	
		< PHOTO INTERRUPTER >	
PH100	8-749-013-23	PHOTO INTERRUPTER GP3S120	
PH101	8-749-013-23	PHOTO INTERRUPTER GP3S120	
		< IC LINK >	
⚠PS100	1-533-586-31	LINK, IC 491.315 (0.315A)	
⚠PS301	1-533-586-31	LINK, IC 491.315 (0.315A)	
⚠PS600	1-533-593-11	LINK, IC 491002 (2A)	
⚠PS601	1-533-586-31	LINK, IC 491.315 (0.315A)	
		< TRANSISTOR >	
Q100	8-729-043-84	TRANSISTOR PT380F3	
Q101	8-729-043-84	TRANSISTOR PT380F3	
Q102	8-729-281-53	TRANSISTOR 2SC1815-GR	
Q103	8-729-010-29	TRANSISTOR MSD601-RST1	
Q105	8-729-010-29	TRANSISTOR MSD601-RST1 (ED7/ED8)	
Q201	8-729-421-19	TRANSISTOR UN2213 (ED4/ED7/ED8)	
Q202	8-729-901-06	TRANSISTOR DTA144EK	
Q204	8-729-421-19	TRANSISTOR UN2213	
Q205	8-729-421-19	TRANSISTOR UN2213	
Q207	8-729-421-19	TRANSISTOR UN2213	
Q208	8-729-010-29	TRANSISTOR MSD601-RST1	
Q209	8-729-010-29	TRANSISTOR MSD601-RST1	
Q210	8-729-421-19	TRANSISTOR UN2213	
Q301	8-729-010-29	TRANSISTOR MSD601-RST1	
Q302	8-729-010-29	TRANSISTOR MSD601-RST1	
Q303	8-729-901-06	TRANSISTOR DTA144EK	
Q305	8-729-012-31	TRANSISTOR 2SC4040-TL2-Q	
Q307	8-729-900-51	TRANSISTOR DTA114TK	
Q308	8-729-421-19	TRANSISTOR UN2213	
Q311	8-729-421-19	TRANSISTOR UN2213	
Q312	8-729-010-29	TRANSISTOR MSD601-RST1	
Q330	8-729-012-31	TRANSISTOR 2SC4040-TL2-Q (ED7/ED8)	
Q331	8-729-900-51	TRANSISTOR DTA114TK (ED7/ED8)	
Q332	8-729-010-29	TRANSISTOR MSD601-RST1	
Q400	8-729-010-05	TRANSISTOR MSB709-RT1	
Q402	8-729-421-22	TRANSISTOR UN2211	
Q501	8-729-230-49	TRANSISTOR 2SC2712-G	
Q600	8-729-140-93	TRANSISTOR 2SB733-34	
Q601	8-729-421-22	TRANSISTOR UN2211	
Q602	8-729-018-99	TRANSISTOR 2SD2394-F	
Q603	8-729-119-79	TRANSISTOR 2SC2785-FEK	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

MA-323

Ref. No.	Part No.	Description			Remark
Q701	8-729-106-68	TRANSISTOR	2SD1615A-GP		
Q703	8-729-010-29	TRANSISTOR	MSD601-RST1 (ED7)		
Q754	8-729-421-19	TRANSISTOR	UN2213 (ED8)		
Q901	8-729-010-05	TRANSISTOR	MSB709-RT1		
		< RESISTOR >			
R100	1-216-089-00	METAL CHIP	47K	5%	1/10W
R101	1-216-041-00	METAL CHIP	470	5%	1/10W
R102	1-249-437-11	CARBON	47K	5%	1/4W
R103	1-216-085-00	METAL CHIP	33K	5%	1/10W
R104	1-216-085-00	METAL CHIP	33K	5%	1/10W
R105	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R106	1-249-417-11	CARBON	1K	5%	1/4W F
R107	1-249-400-11	CARBON	39	5%	1/4W F
R108	1-249-400-11	CARBON	39	5%	1/4W F
R109	1-247-807-31	CARBON	100	5%	1/4W
R110	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R111	1-216-073-00	METAL CHIP	10K	5%	1/10W
R112	1-216-073-00	METAL CHIP	10K	5%	1/10W
R113	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R114	1-216-049-00	METAL CHIP	1K	5%	1/10W
R115	1-216-049-00	METAL CHIP	1K	5%	1/10W
R116	1-247-863-91	CARBON	22K	5%	1/4W
R117	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R118	1-216-049-00	METAL CHIP	1K	5%	1/10W
R119	1-216-073-00	METAL CHIP	10K	5%	1/10W
R120	1-216-049-00	METAL CHIP	1K	5%	1/10W
R121	1-216-103-00	METAL CHIP	180K	5%	1/10W
R122	1-216-049-00	METAL CHIP	1K	5%	1/10W
R123	1-216-121-91	RES, CHIP	1M	5%	1/10W
R124	1-216-037-00	METAL CHIP	330	5%	1/10W
R125	1-216-037-00	METAL CHIP	330	5%	1/10W
R126	1-216-077-00	METAL CHIP	15K	5%	1/10W (ED8)
R126	1-216-081-00	METAL CHIP	22K	5%	1/10W (ED7)
R126	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (ED4)
R126	1-216-059-00	METAL CHIP	2.7K	5%	1/10W (ED1)
R127	1-216-073-00	METAL CHIP	10K	5%	1/10W
R128	1-249-407-11	CARBON	150	5%	1/4W F(ED1)
R129	1-216-049-00	METAL CHIP	1K	5%	1/10W
R130	1-216-085-00	METAL CHIP	33K	5%	1/10W
R131	1-216-085-00	METAL CHIP	33K	5%	1/10W
R132	1-216-089-00	METAL CHIP	47K	5%	1/10W
R133	1-249-429-11	CARBON	10K	5%	1/4W
R134	1-249-429-11	CARBON	10K	5%	1/4W
R135	1-216-049-00	METAL CHIP	1K	5%	1/10W
R136	1-216-103-00	METAL CHIP	180K	5%	1/10W
R137	1-216-089-00	METAL CHIP	47K	5%	1/10W (ED7/ED8)
R138	1-249-413-11	CARBON	470	5%	1/4W F
R139	1-249-413-11	CARBON	470	5%	1/4W F
R140	1-249-413-11	CARBON	470	5%	1/4W F
R141	1-216-073-00	METAL CHIP	10K	5%	1/10W
R142	1-216-021-00	METAL CHIP	68	5%	1/10W
R143	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R144	1-249-419-11	CARBON	1.5K	5%	1/4W F(ED1)
R145	1-249-421-11	CARBON	2.2K	5%	1/4W F(ED1)
R146	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R147	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R148	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R149	1-216-091-00	METAL CHIP	56K	5%	1/10W
R151	1-216-073-00	METAL CHIP	10K	5%	1/10W
R152	1-216-021-00	METAL CHIP	68	5%	1/10W
R153	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R154	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R155	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R156	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R159	1-216-073-00	METAL CHIP	10K	5%	1/10W
R160	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R161	1-216-073-00	METAL CHIP	10K	5%	1/10W
R162	1-216-049-00	METAL CHIP	1K	5%	1/10W
R163	1-216-073-00	METAL CHIP	10K	5%	1/10W
R164	1-216-049-00	METAL CHIP	1K	5%	1/10W
R169	1-249-417-11	CARBON	1K	5%	1/4W F
R170	1-216-121-91	RES, CHIP	1M	5%	1/10W
R171	1-216-049-00	METAL CHIP	1K	5%	1/10W
R172	1-249-417-11	CARBON	1K	5%	1/4W F
R173	1-249-417-11	CARBON	1K	5%	1/4W F
R174	1-216-081-00	METAL CHIP	22K	5%	1/10W
R175	1-216-113-00	METAL CHIP	470K	5%	1/10W
R176	1-216-089-00	METAL CHIP	47K	5%	1/10W
R177	1-216-105-91	RES, CHIP	220K	5%	1/10W
R178	1-216-089-00	METAL CHIP	47K	5%	1/10W
R179	1-216-089-00	METAL CHIP	47K	5%	1/10W
R180	1-216-089-00	METAL CHIP	47K	5%	1/10W
R181	1-249-413-11	CARBON	470	5%	1/4W F
R183	1-249-413-11	CARBON	470	5%	1/4W F
R186	1-216-049-00	METAL CHIP	1K	5%	1/10W
R187	1-216-049-00	METAL CHIP	1K	5%	1/10W
R188	1-249-417-11	CARBON	1K	5%	1/4W F
R189	1-216-041-00	METAL CHIP	470	5%	1/10W
R191	1-216-089-00	METAL CHIP	47K	5%	1/10W
R192	1-216-089-00	METAL CHIP	47K	5%	1/10W
R198	1-216-089-00	METAL CHIP	47K	5%	1/10W
R199	1-249-413-11	CARBON	470	5%	1/4W F
R201	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (ED4/ED7/ED8)
R201	1-216-083-00	METAL CHIP	27K	5%	1/10W (ED1)
R202	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
R203	1-249-438-11	CARBON	56K	5%	1/4W
R204	1-216-041-00	METAL CHIP	470	5%	1/10W
R205	1-247-887-00	CARBON	220K	5%	1/4W
R206	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R207	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R208	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R209	1-216-053-00	METAL CHIP	1.5K	5%	1/10W (ED4/ED7/ED8)
R209	1-216-061-00	METAL CHIP	3.3K	5%	1/10W (ED1)
R210	1-216-057-00	METAL CHIP	2.2K	5%	1/10W (ED4/ED7/ED8)
R211	1-247-807-31	CARBON	100	5%	1/4W
R212	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R213	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (ED4/ED7/ED8)

Ref. No.	Part No.	Description			Remark
R213	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (ED1)
R215	1-259-880-11	CARBON	2.2M	5%	1/4W
R216	1-216-089-00	METAL CHIP	47K	5%	1/10W
R217	1-216-089-00	METAL CHIP	47K	5%	1/10W
R218	1-216-061-00	METAL CHIP	3.3K	5%	1/10W (ED4/ED7/ED8)
R218	1-216-057-00	METAL CHIP	2.2K	5%	1/10W (ED1)
R219	1-216-089-00	METAL CHIP	47K	5%	1/10W
R220	1-216-089-00	METAL CHIP	47K	5%	1/10W
R221	1-247-807-31	CARBON	100	5%	1/4W
R222	1-216-041-00	METAL CHIP	470	5%	1/10W
R223	1-216-295-00	METAL CHIP	0	5%	1/10W
R224	1-216-073-00	METAL CHIP	10K	5%	1/10W
R225	1-249-417-11	CARBON	1K	5%	1/4W F
R226	1-216-295-00	METAL CHIP	0	5%	1/10W
R227	1-216-295-00	METAL CHIP	0	5%	1/10W
R228	1-216-295-00	METAL CHIP	0	5%	1/10W
R229	1-216-073-00	METAL CHIP	10K	5%	1/10W
R230	1-216-081-00	METAL CHIP	22K	5%	1/10W
R231	1-216-049-00	METAL CHIP	1K	5%	1/10W
R232	1-216-041-00	METAL CHIP	470	5%	1/10W
R234	1-216-041-00	METAL CHIP	470	5%	1/10W (ED7/ED8)
R235	1-249-413-11	CARBON	470	5%	1/4W F
R236	1-247-863-91	CARBON	22K	5%	1/4W
R237	1-216-105-91	RES, CHIP	220K	5%	1/10W
R240	1-216-041-00	METAL CHIP	470	5%	1/10W
R241	1-249-421-11	CARBON	2.2K	5%	1/4W F
R242	1-216-113-00	METAL CHIP	470K	5%	1/10W
R301	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R302	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R303	1-216-083-00	METAL CHIP	27K	5%	1/10W
R304	1-216-089-00	METAL CHIP	47K	5%	1/10W
R305	1-216-073-00	METAL CHIP	10K	5%	1/10W
R306	1-216-047-91	RES, CHIP	820	5%	1/10W
R307	1-216-047-91	RES, CHIP	820	5%	1/10W
R308	1-216-079-00	METAL CHIP	18K	5%	1/10W
R310	1-216-035-00	METAL CHIP	270	5%	1/10W
R311	1-249-428-11	CARBON	8.2K	5%	1/4W F
R312	1-216-081-00	METAL CHIP	22K	5%	1/10W
R313	1-216-109-00	METAL CHIP	330K	5%	1/10W
R314	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R315	1-249-395-11	CARBON	15	5%	1/4W F (ED7/ED8)
R315	1-249-389-11	CARBON	4.7	5%	1/4W F (ED1/ED4)
R316	1-216-295-00	METAL CHIP	0	5%	1/10W
R317	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R318	1-216-689-11	METAL CHIP	39K	0.5%	1/10W (ED1/ED4)
R319	1-216-041-00	METAL CHIP	470	5%	1/10W
R320	1-216-075-00	METAL CHIP	12K	5%	1/10W (ED1/ED4)
R321	1-216-077-00	METAL CHIP	15K	5%	1/10W (ED7/ED8)
R321	1-216-075-00	METAL CHIP	12K	5%	1/10W (ED1/ED4)
R322	1-216-097-91	RES,CHIP	100K	5%	1/10W
R323	1-216-097-91	RES,CHIP	100K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R326	1-249-429-11	CARBON	10K	5%	1/4W
R327	1-216-073-00	METAL CHIP	10K	5%	1/10W
R330	1-216-083-00	METAL CHIP	27K	5%	1/10W (ED7/ED8)
R331	1-216-296-00	METAL CHIP	0	5%	1/8W (ED7/ED8)
R332	1-249-394-11	CARBON	12	5%	1/4W F (ED7/ED8)
R333	1-216-049-00	METAL CHIP	1K	5%	1/10W
R334	1-216-049-00	METAL CHIP	1K	5%	1/10W
R335	1-216-073-00	METAL CHIP	10K	5%	1/10W
R336	1-249-413-11	CARBON	470	5%	1/4W F
R344	1-216-055-00	METAL CHIP	1.8K	5%	1/10W (ED7/ED8)
R345	1-216-081-00	METAL CHIP	22K	5%	1/10W (ED7/ED8)
R346	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (ED7/ED8)
R347	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (ED7/ED8)
R348	1-216-033-00	METAL CHIP	220	5%	1/10W (ED7/ED8)
R360	1-216-049-00	METAL CHIP	1K	5%	1/10W (ED7/ED8)
R361	1-216-049-00	METAL CHIP	1K	5%	1/10W (ED7/ED8)
R368	1-216-133-00	METAL CHIP	3.3M	5%	1/10W (ED7/ED8)
R370	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (ED7/ED8)
R371	1-216-689-11	METAL CHIP	39K	0.5%	1/10W (ED7/ED8)
R372	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (ED7/ED8)
R378	1-216-083-00	METAL CHIP	27K	5%	1/10W (ED7/ED8)
R380	1-216-041-00	METAL CHIP	470	5%	1/10W (ED7/ED8)
R381	1-216-041-00	METAL CHIP	470	5%	1/10W (ED7/ED8)
R382	1-216-041-00	METAL CHIP	470	5%	1/10W (ED7/ED8)
R383	1-216-041-00	METAL CHIP	470	5%	1/10W (ED7/ED8)
R384	1-216-091-00	METAL CHIP	56K	5%	1/10W (ED7/ED8)
R385	1-216-091-00	METAL CHIP	56K	5%	1/10W (ED7/ED8)
R389	1-216-073-00	METAL CHIP	10K	5%	1/10W (ED7/ED8)
R400	1-216-113-00	METAL CHIP	470K	5%	1/10W
R401	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R402	1-216-049-00	METAL CHIP	1K	5%	1/10W
R403	1-216-041-00	METAL CHIP	470	5%	1/10W
R405	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R406	1-216-041-00	METAL CHIP	470	5%	1/10W
R407	1-216-295-00	METAL CHIP	0	5%	1/10W
R408	1-247-807-31	CARBON	100	5%	1/4W
R410	1-216-073-00	METAL CHIP	10K	5%	1/10W
R411	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R412	1-249-425-11	CARBON	4.7K	5%	1/4W F

MA-323

Ref. No.	Part No.	Description			Remark
R414	1-216-121-91	RES, CHIP	1M	5%	1/10W
R421	1-216-049-00	METAL CHIP	1K	5%	1/10W
R422	1-216-049-00	METAL CHIP	1K	5%	1/10W
R423	1-216-049-00	METAL CHIP	1K	5%	1/10W
R424	1-216-049-00	METAL CHIP	1K	5%	1/10W
R425	1-216-085-00	METAL CHIP	33K	5%	1/10W
R426	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R428	1-216-041-00	METAL CHIP	470	5%	1/10W
R429	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R501	1-216-037-00	METAL CHIP	330	5%	1/10W (ED4/ED7/ED8)
R501	1-216-045-00	METAL CHIP	680	5%	1/10W (ED1)
R502	1-216-037-00	METAL CHIP	330	5%	1/10W (ED4/ED7/ED8)
R503	1-216-295-00	METAL CHIP	0	5%	1/10W
R504	1-216-295-00	METAL CHIP	0	5%	1/10W
R505	1-216-295-00	METAL CHIP	0	5%	1/10W
R506	1-216-295-00	METAL CHIP	0	5%	1/10W
R507	1-216-053-00	METAL CHIP	1.5K	5%	1/10W (ED4/ED7/ED8)
R507	1-216-055-00	METAL CHIP	1.8K	5%	1/10W (ED1)
R508	1-216-049-00	METAL CHIP	1K	5%	1/10W
R509	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R510	1-216-073-00	METAL CHIP	10K	5%	1/10W
R511	1-216-081-00	METAL CHIP	22K	5%	1/10W
R512	1-216-081-00	METAL CHIP	22K	5%	1/10W
R513	1-216-049-00	METAL CHIP	1K	5%	1/10W
R514	1-216-077-00	METAL CHIP	15K	5%	1/10W
R515	1-216-077-00	METAL CHIP	15K	5%	1/10W
R516	1-216-073-00	METAL CHIP	10K	5%	1/10W
R517	1-216-073-00	METAL CHIP	10K	5%	1/10W
R518	1-216-025-91	RES,CHIP	100	5%	1/10W (ED1)
R600	1-249-417-11	CARBON	1K	5%	1/4W F
R601	1-216-430-11	METAL OXIDE	390	5%	1W F
R602	1-249-417-11	CARBON	1K	5%	1/4W F
R603	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R604	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R605	1-249-414-11	CARBON	560	5%	1/4W F
R606	1-247-815-91	CARBON	220	5%	1/4W
R607	1-247-815-91	CARBON	220	5%	1/4W
R608	1-215-908-00	METAL OXIDE	33	5%	3W F
R609	1-215-857-11	METAL OXIDE	10	5%	1W F
R610	1-249-417-11	CARBON	1K	5%	1/4W F
R701	1-216-041-00	METAL CHIP	470	5%	1/10W
R702	1-216-041-00	METAL CHIP	470	5%	1/10W
R703	1-216-049-00	METAL CHIP	1K	5%	1/10W
R704	1-216-049-00	METAL CHIP	1K	5%	1/10W
R705	1-249-417-11	CARBON	1K	5%	1/4W F
R706	1-216-049-00	METAL CHIP	1K	5%	1/10W
R707	1-212-893-00	FUSIBLE	330	5%	1/4W F
R708	1-216-113-00	METAL CHIP	470K	5%	1/10W
R709	1-216-295-00	METAL CHIP	0	5%	1/10W
R710	1-216-295-00	METAL CHIP	0	5%	1/10W
R711	1-216-295-00	METAL CHIP	0	5%	1/10W
R712	1-216-295-00	METAL CHIP	0	5%	1/10W
R713	1-216-295-00	METAL CHIP	0	5%	1/10W
R714	1-216-295-00	METAL CHIP	0	5%	1/10W
R725	1-216-077-00	METAL CHIP	15K	5%	1/10W (ED7)
R726	1-216-075-00	METAL CHIP	12K	5%	1/10W (ED7)
R752	1-216-295-00	METAL CHIP	0	5%	1/10W (ED7/ED8)
R753	1-216-081-00	METAL CHIP	22K	5%	1/10W (ED8)
R754	1-216-081-00	METAL CHIP	22K	5%	1/10W (ED8)
R757	1-216-073-00	METAL CHIP	10K	5%	1/10W (ED8)
R758	1-216-295-00	METAL CHIP	0	5%	1/10W (ED1/ED4)
R759	1-216-041-00	METAL CHIP	470	5%	1/10W (ED8)
R760	1-216-073-00	METAL CHIP	10K	5%	1/10W (ED8)
R901	1-216-021-00	METAL CHIP	68	5%	1/10W
R902	1-249-407-11	CARBON	150	5%	1/4W F
R904	1-249-408-11	CARBON	180	5%	1/4W F
R905	1-216-025-91	RES,CHIP	100	5%	1/10W (ED4/ED7/ED8)
R906	1-216-021-00	METAL CHIP	68	5%	1/10W
R907	1-216-041-00	METAL CHIP	470	5%	1/10W
R908	1-216-041-00	METAL CHIP	470	5%	1/10W (ED7/ED8)
R909	1-216-097-91	RES, CHIP	100K	5%	1/10W
R910	1-216-097-91	RES, CHIP	100K	5%	1/10W (ED7/ED8)
R911	1-216-097-91	RES, CHIP	100K	5%	1/10W (ED7/ED8)
R911	1-216-295-00	METAL CHIP	0	5%	1/10W (ED1/ED4)
R912	1-216-097-91	RES, CHIP	100K	5%	1/10W
R913	1-216-025-91	RES, CHIP	100	5%	1/10W (ED1)
R927	1-216-295-00	METAL CHIP	0	5%	1/10W
		< VARIABLE RESISTOR >			
RV750	1-241-766-11	RES, ADJ, CERMET 47K (US MPX SEP) (ED8)			
		< SWITCH >			
S100	1-771-155-11	SWITCH, ROTARY (CAM ENCODER)			
S101	1-762-108-11	SWITCH, PUSH (1 KEY) (REC PRF)			
S102	1-692-431-21	SWITCH, TACTILE (POWER) (ED1)			
S103	1-692-431-21	SWITCH, TACTILE (EJECT) (ED1)			
S104	1-692-431-21	SWITCH, TACTILE (REC) (ED1)			
S105	1-692-431-21	SWITCH, TACTILE (CHANNEL +) (ED1)			
S106	1-692-431-21	SWITCH, TACTILE (EASY TIMER) (ED1)			
S107	1-692-431-21	SWITCH, TACTILE (PAUSE) (ED1)			
S108	1-692-431-21	SWITCH, TACTILE (CHANNEL -) (ED1)			
S112	1-692-431-21	SWITCH, TACTILE (ONE TOUCH TUNING) (ED4/ED7/ED8)			
S113	1-692-431-21	SWITCH, TACTILE (SP/EP) (ED4/ED7/ED8)			
S116	1-692-431-21	SWITCH, TACTILE (CHANNEL +)(ED4/ED7/ED8)			
S117	1-692-431-21	SWITCH, TACTILE (EASY TIMER)(ED4/ED7/ED8)			

Ref. No.	Part No.	Description	Remark
S118	1-692-431-21	SWITCH, TACTILE (INPUT SELECT)	
S119	1-692-431-21	SWITCH, TACTILE (CHANNEL -)(ED4/ED7/ED8)	
S120	1-692-431-21	SWITCH, TACTILE	(ONE TOUCH TUNING) (ED1)
S701	1-571-588-11	SWITCH, SLIDE (RF UNIT)	
		< TRANSFORMER >	
T301	1-423-413-11	TRANSFORMER, BIAS OSCILLATION	(ED7/ED8)
T301	1-423-414-11	TRANSFORMER, BIAS OSCILLATION	(ED1/ED4)
T302	1-423-415-11	TRANSFORMER, BIAS OSCILLATION	(ED7/ED8)
		< TUNER >	
TU701	1-693-370-11	TUNER, RF IF (ED1/ED4/ED8)	
TU701	1-693-413-11	TUNER, MOD/IF SOLID TYPE (ED7)	
		< VIBRATOR >	
X161	1-767-855-11	VIBRATOR, CRYSTAL (10MHz)	
X162	1-579-463-11	VIBRATOR, CRYSTAL (32.768kHz)	
* X201	1-760-709-11	VIBRATOR, CRYSTAL (3.58MHz)	
X401	1-767-857-11	VIBRATOR, CRYSTAL (14.31818MHz)	

Ref. No.	Part No.	Description	Remark
*	A-6791-589-A	MF-312 BOARD, COMPLETE (ED7/ED8)	
*	A-6791-575-A	MF-312 BOARD, COMPLETE (ED4) **********************	(Ref.No.1,000 Series)
		< CAPACITOR >	
C401	1-163-809-11	CERAMIC CHIP 0.047uF 10% 25V	
		< CONNECTOR >	
CN407	1-506-484-11	PIN, CONNECTOR 5P (ED7/ED8)	
CN408	1-691-064-31	HOUSING, CONNECTOR 5P	
		< DIODE >	
D405	8-719-056-07	DIODE SLR-342MCT31 (POWER)	
D480	8-719-109-93	DIODE RD6.2ES-B2 (ED7/ED8)	
D481	8-719-108-12	DIODE RD9.1E-W	
D490	8-719-108-12	DIODE RD9.1E-W	
D491	8-719-108-12	DIODE RD9.1E-W (ED7/ED8)	
		< IC >	
IC401	8-749-011-05	IC GP1U28X	
		< JACK >	
J481	1-766-861-11	JACK, PIN (3P) (LINE-2 IN) (ED8)	
		< JUMPER RESISTOR >	
JR400	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR401	1-216-296-00	METAL CHIP 0 5% 1/8W	(ED7/ED8)
JS494	1-216-295-00	METAL CHIP 0 5% 1/10W	(ED7/ED8)
		< RESISTOR >	
R401	1-216-029-00	METAL CHIP 150 5% 1/10W	
R402	1-216-295-00	METAL CHIP 0 5% 1/10W	
R403	1-216-295-00	METAL CHIP 0 5% 1/10W	
R480	1-216-022-00	METAL CHIP 75 5% 1/10W	(ED7/ED8)
R490	1-216-295-00	METAL CHIP 0 5% 1/10W	(ED7/ED8)
R491	1-216-295-00	METAL CHIP 0 5% 1/10W	(ED7/ED8)
		< SWITCH >	
S403	1-762-196-21	SWITCH, TACTILE (POWER)	

Ref. No.	Part No.	Description	Remark
*	A-6791-591-A	NK-11 BOARD, COMPLETE (ED7) *********************	(Ref.No.1,000 Series)
		< CAPACITOR >	
C003	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C004	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C005	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C006	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C007	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C008	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C009	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C010	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C011	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C012	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C013	1-163-243-11	CERAMIC CHIP 47PF 5% 50V	
C014	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C015	1-163-231-11	CERAMIC CHIP 15PF 5% 50V	
C016	1-163-099-00	CERAMIC CHIP 18PF 5% 50V	
C017	1-110-501-11	CERAMIC CHIP 0.33uF 10% 16V	
C018	1-163-989-11	CERAMIC CHIP 0.033uF 10% 25V	
C019	1-109-982-11	CERAMIC CHIP 1uF 10% 10V	
C020	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C021	1-113-642-11	TANTAL. CHIP 47uF 10% 10V	
C022	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C023	1-163-243-11	CERAMIC CHIP 47PF 5% 50V	
		< CONNECTOR >	
* CN001	1-691-183-11	CONNECTOR (BOARD TO BOARD) 13P	
		< DIODE >	
D001	8-719-066-72	DIODE BB135	
		< FERRITE BEAD >	
FB001	1-543-813-21	FERRITE 0UH	
FB002	1-543-813-21	FERRITE 0UH	
FB003	1-543-813-21	FERRITE 0UH	
		< IC >	
IC001	8-759-526-43	IC TDA9874H/V1,118	
		< COIL >	
L006	1-412-945-11	INDUCTOR 3.3uH	

NK-11 POWER BLOCK

Ref. No.	Part No.	Description			Remark
		< IC LINK >			
⚠PS001	1-576-122-21	LINK, IC CCP2E10 (0.4A)			
		< RESISTOR >			
R001	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R002	1-216-073-00	METAL CHIP	10K	5%	1/10W
R003	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R004	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R005	1-216-041-00	METAL CHIP	470	5%	1/10W
R006	1-216-041-00	METAL CHIP	470	5%	1/10W
R007	1-216-001-00	METAL CHIP	10	5%	1/10W
R008	1-216-001-00	METAL CHIP	10	5%	1/10W
R009	1-216-001-00	METAL CHIP	10	5%	1/10W
R010	1-216-001-00	METAL CHIP	10	5%	1/10W
R011	1-216-304-11	METAL CHIP	3.3	5%	1/10W
R012	1-216-304-11	METAL CHIP	3.3	5%	1/10W
R013	1-216-001-00	METAL CHIP	10	5%	1/10W
R014	1-216-295-00	METAL CHIP	0	5%	1/10W
R015	1-216-295-00	METAL CHIP	0	5%	1/10W
R016	1-216-033-00	METAL CHIP	220	5%	1/10W
		< VIBRATOR >			
X001	1-767-897-11	VIBRATOR, CRYSTAL (24.576MHz)			

Ref. No.	Part No.	Description			Remark
	1-468-312-11	POWER BLOCK (HS-921SF) (ED1)			
	1-468-312-21	POWER BLOCK (HS-921SF1) (ED4)			
		***********************			
					(Ref.No. 3,000 Series)
		< CAPACITOR >			
⚠C101	1-115-165-11	FILM	0.1uF	250V	
⚠C102	1-115-165-11	FILM	0.1uF	250V	
⚠C108	9-980-012-01	ELECT	150uF	400V	
C207	1-126-964-11	ELECT	10uF	50V	
C401	1-126-967-11	ELECT	47uF	50V	
		< DIODE >			
⚠D102	8-719-312-16	DIODE EG01			
⚠D104	9-980-073-01	DIODE 1SS270A			
⚠D106	8-719-100-30	DIODE RD12ES			
⚠D201	8-719-018-83	DIODE D2S4M			
⚠D401	8-719-052-89	DIODE D1NL40			
⚠D501	8-719-026-52	DIODE 10ELS2			
		< FUSE >			
⚠F101	1-532-388-31	FUSE (2.0A/250V)			
		< IC >			
⚠IC101	9-939-634-01	IC MIP-164			
⚠IC201	8-759-420-19	IC AN1431T			
		< PHOTO COUPLER >			
⚠PC101	8-749-924-84	COUPLER, PHOTO PS2561			

Ref. No.	Part No.	Description			Remark
	1-468-311-21	POWER BLOCK (SR-708) (ED7/ED8)			
		*********************			
					(Ref.No. 4,000 Series)
		< CAPACITOR >			
C112	1-130-495-51	FILM	0.1uF	50V	
C114	1-130-495-51	FILM	0.1uF	50V	
C115	1-130-495-51	FILM	0.1uF	50V	
		< DIODE >			
⚠D107	9-900-534-01	DIODE ERA18-02			
⚠D108	9-900-534-01	DIODE ERA18-02			
D205	9-900-534-01	DIODE ERA18-02			
		< FUSE >			
⚠F101	1-532-388-31	FUSE (2.0A/250V)			
		< IC >			
⚠IC201	8-759-420-19	IC AN1431T			
		< PHOTO COUPLER >			
⚠PC101	8-749-924-84	COUPLER, PHOTO PS2561			
		< RESISTOR >			
R208	9-908-233-01	FUSIBLE	0.47	1/4W	

Ref. No.	Part No.	Description	Remark
		MISCELLANEOUS	
		**************	
10	1-783-567-11	CABLE, FLAT (FDS-4)	
52	1-783-566-11	CABLE, FLAT (FMD-12)	
⚠56	1-777-854-21	CORD, POWER	
111	1-783-569-11	CABLE, FLAT (FDM-4)	
114	1-783-568-11	CABLE, FLAT (FMF-23)	
121	1-762-844-21	SWITCH, ROTARY (ED8)	
⚠157	1-782-752-11	CORD, POWER	
704	1-500-144-11	HEAD, FE	
768	1-759-455-11	DRUM ASSY, DZH-71D-R (ED1)	
768	8-839-036-04	DRUM ASSY, DZH-93D/Z-RP (ED4)	
768	8-839-004-02	DRUM ASSY, DZH-94A/ZRP-R (ED7/ED8)	
M902	1-698-971-11	MOTOR, DC (CAPSTAN)	
M903	X-3947-577-1	MOTOR ASSY, CAM	

Ref. No.	Part No.	Description	Remark
		**************	
		HARDWARE LIST	
		**************	
#1	7-685-648-79	SCREW +BVTP 3X12 TYPE2 IT-3	
#2	7-682-547-04	SCREW +P 3X6	
#3	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
#4	7-685-133-19	SCREW (DIA. 2.6) (IT3B)	

Ref. No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS	
		**********************************	
	1-475-613-11	COMMANDER, STANDARD	
			(RMT-V248) (ED1/ED4)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
	1-475-616-31	COMMANDER, STANDARD (RMT-V247B)(ED7/ED8)	
⚠	1-569-008-21	ADAPTOR, CONVERSION 2P (ED1/ED4/ED8)	
	1-696-592-11	CORD, CONNECTION (NTSC)	
	3-709-133-11	COVER, BATTERY (for RMT-V247B) (ED7/ED8)	
	3-709-322-01	COVER, BATTERY (for RMT-V248) (ED1/ED4)	
	3-861-813-11	MANUAL, INSTRUCTION (KOREAN) (ED7)	
	3-861-815-11	MANUAL, INSTRUCTION (ENGLISH) (ED8)	
	3-861-816-11	MANUAL, INSTRUCTION (ENGLISH) (ED4)	
	3-861-817-11	MANUAL, INSTRUCTION (ENGLISH) (ED1)	
*	3-961-581-01	SHEET, PROTECTION (ED1)	
*	3-979-709-01	CUSHION (ED1)	
*	3-979-710-01	SPACER (ED1)	
*	3-987-410-33	INDIVIDUAL CARTON (ED1)	
*	3-987-419-61	INDIVIDUAL CARTON (ED4)	
*	3-987-420-71	INDIVIDUAL CARTON (ED8)	
*	3-987-421-01	CUSHION (ED4/ED7/ED8)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

9-921-694-11

Sony Corporation
Home A&V Products Company

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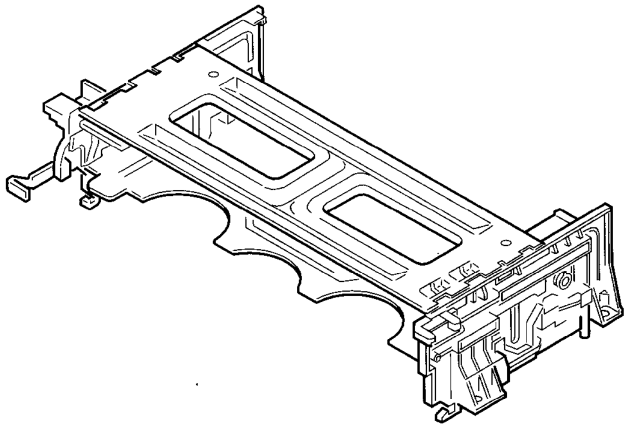
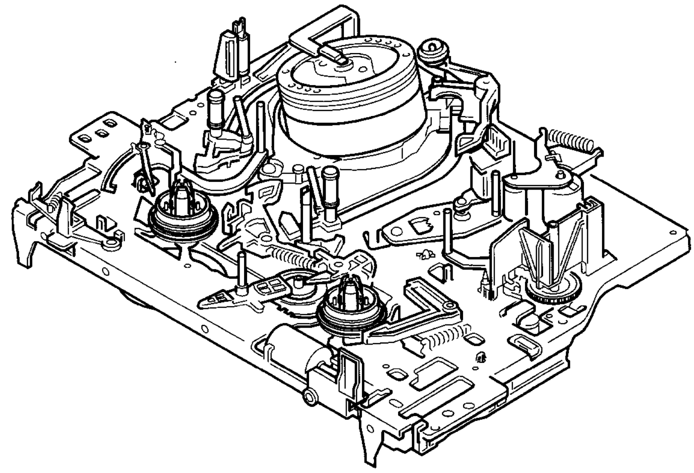
VHS MECHANICAL ADJUSTMENT MANUAL Ⅵ

S MECHANISM

VHS

Please use with the service manual.





VHS TAPE TRANSPORT MECHANISM DECK

MICROFILM

SONY®

ADJUSTMENTS REQUIRED THE FOLLOWING PARTS REPLACEMENT

PARTS	ADJUSTMENTS	4-1-1	4-1-2	4-1-3	4-1-4	4-1-5	4-1-6	4-1-7	4-1-8
		TENSION REGULATOR POSITION/TENSION ADJUSTMENT	CHECKING THE TENSION AND TORQUE	X-VALUE ADJUSTMENT	HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6	ACE HEAD HEIGHT AND AZIMUTH ADJUSTMENT	X-VALUE FINE ADJUSTMENT	HEIGHT ADJUSTMENT OF GUIDE ROLLER NO. 8	CHECKING THE LINEARITY AND FLUCTUATION OF THE RF OUTPUT
3-25	REEL (S) TABLE	O	Δ	X	Δ	X	X	X	X
3-25	TG1 ASSEMBLY	O	X	X	Δ	X	X	X	X
3-6	FEH ASSEMBLY	X	X	X	Δ	X	X	X	X
3-23	DRUM BASE	X	X	O	O	O	O	O	O
3-2	DRUM ASSEMBLY	X	X	O	O	O	O	O	O
3-24	SHUTTLE (S) AND SHUTTLE (T) BLOCK ASSEMBLIES	X	X	O	O	O	O	O	X
3-5	ACE HEAD BLOCK	X	X	O	Δ	O	O	Δ	X
3-4	CAPSTAN MOTOR	X	X	X	Δ	O	O	O	X
3-3	PINCHI PRESS BLOCK ASS'Y	X	X	X	X	O	O	O	X
3-3	TG8 ASSEMBLY	X	X	X	X	X	X	O	X
3-10	REEL (T) TABLE	X	X	X	X	X	X	Δ	X
3-19	PULLEY GEAR ASSEMBLY	X	O	X	X	X	X	X	X
3-11	PENDULUM ARM ASSEMBLY	X	O	X	X	X	X	X	X

O: ADJUST
Δ: CHECK
X: NOT REQUIRED

1. PREPARATION FOR MECHANISM CHECKS, ADJUSTMENTS AND REPLACEMENT

For removal of the cabinet, printed wiring boards and others, please refer to the service manual “DISASSEMBLY”.

1-1. LOADING AND THREADING PROCEDURE WHEN THE POWER TURNS OFF

1-1-1. LOADING AND THREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow Ⓐ direction until loading and threading are end.

1-1-2. LOADING AND THREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Applying approx. +9V (300mA) to cam motor with regulated DC power supply makes it loading and threading.

Note : When loading and threading without cassette, claws are caught in four positions as following figure (in the order ①-②-③-④).
So release them with hands.

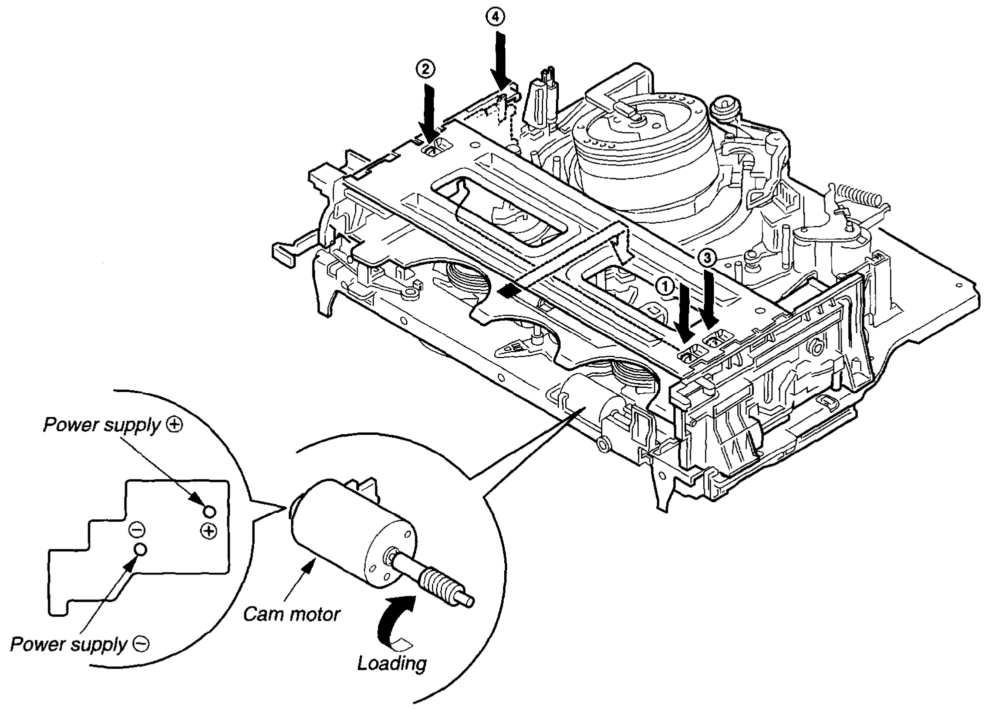


Fig. 1-1

1-2. UNLOADING AND UNTHREADING PROCEDURE WHEN THE POWER TURNS OFF

1-2-1. UNLOADING AND UNTHREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow Ⓑ direction until unthreading is end.
2) Turn capstan motor in the arrow Ⓒ direction to take up tape in cassette.
3) Turn cam motor in the arrow Ⓑ direction until unloading is end.

1-2-2. UNLOADING AND UNTHREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Apply approx. +5V (300mA) to contrary polarities of cam motor.
2) Unthreading operation begins, tape guides return to their initial positions (Unthreading operation is end but tape remains), then stop cam motor by *turning power off.*

Note : When unloading begins and cassette lid is closed, turn cam motor in the arrow Ⓐ direction to open tape guard.

3) Turn capstan motor in the arrow Ⓒ direction to take up tape in cassette.

Note : Take care that tape is not caught at pinch roller.

4) Check that tape is no loosened completely, and apply approx. +5V (300mA) to contrary polarities of cam motor with regulated DC power supply.

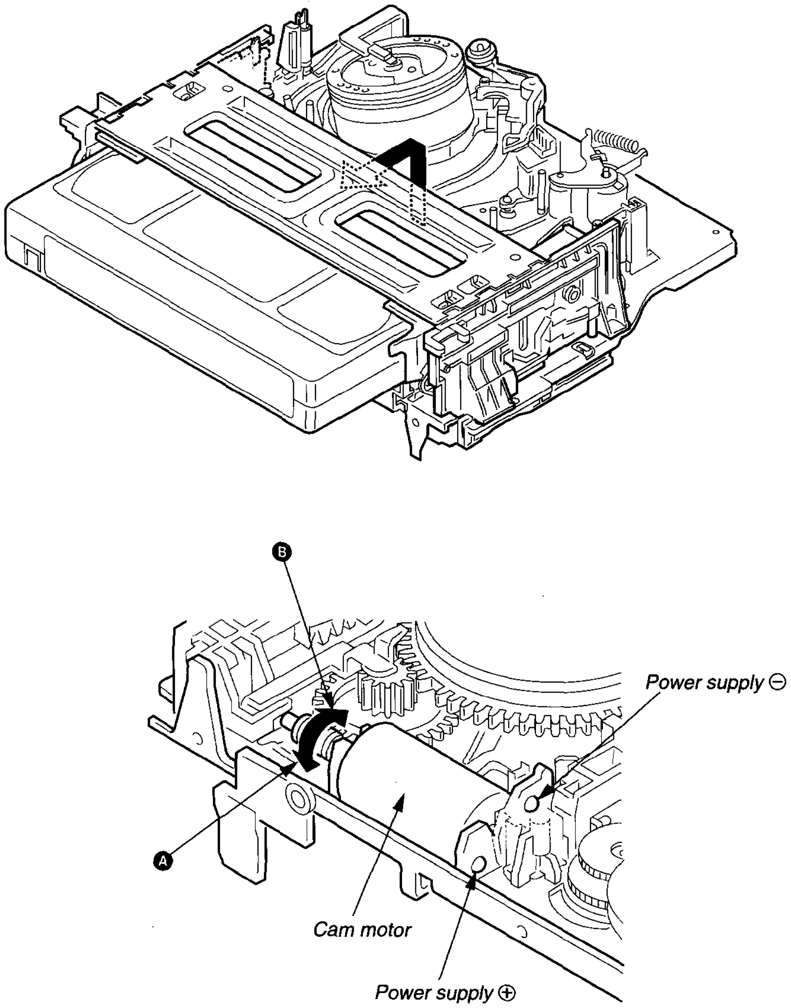


Fig. 1-2

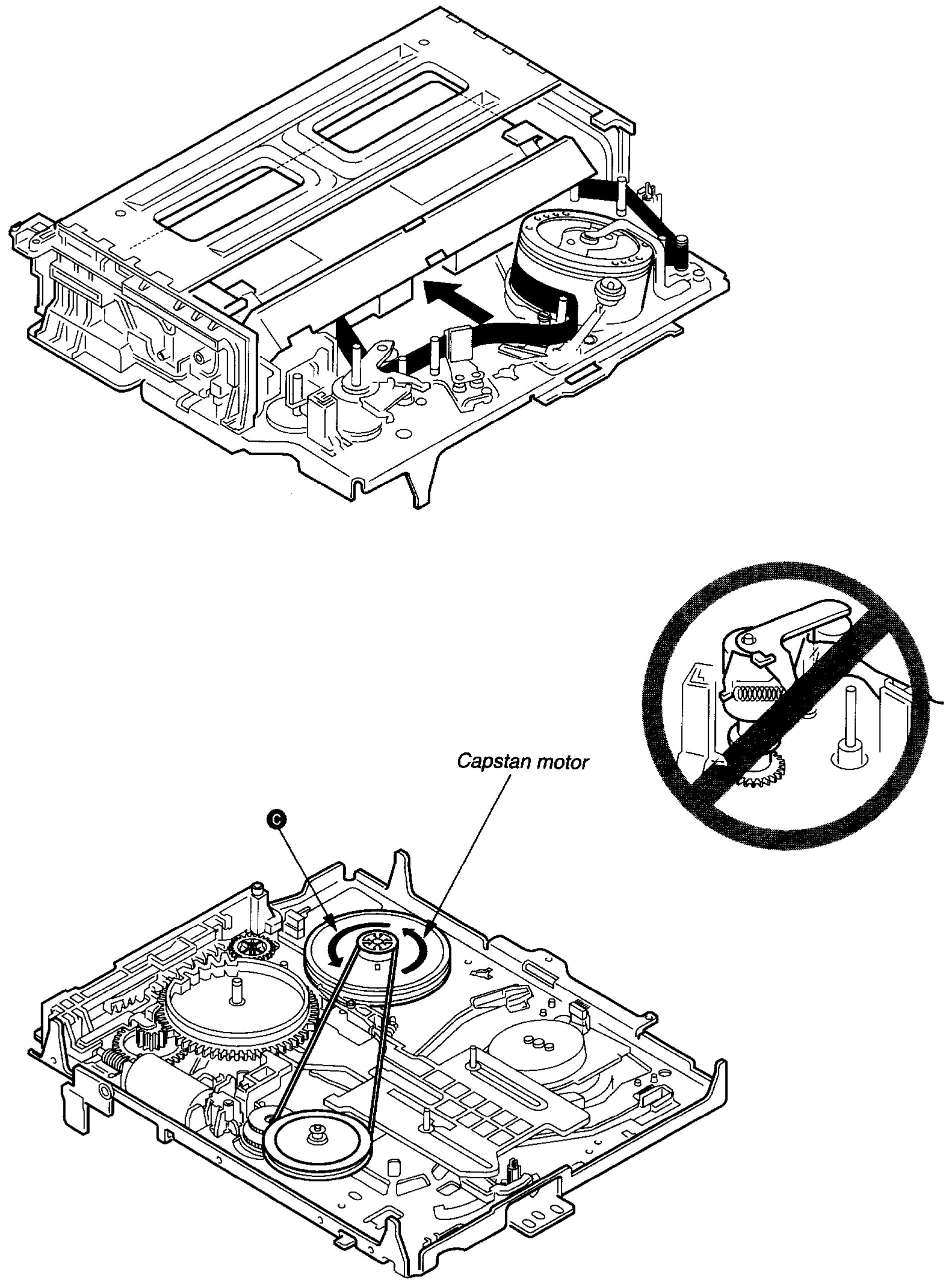

Capstan motor
Ⓒ

Fig. 1-3

1-3. HOW TO COMPLETE THREADING WITHOUT CASSETTE COMPARTMENT

Note 1 : Put the FL block assembly removed the FL top plate on the bottom not to put dust or grease the top sensor and the end sensor luminous plates or not to scratch them.

1) Pull out AC plug from wall outlet.
2) Shade near the end and top sensors with a black masking tape or the like.
3) Connect AC plug to wall outlet.

Note 2 : In this condition, some modes can not be set.
To make loading in this condition, set the video cassette tape without REC proof claw, pull the REC proof lever once and release it.
On loading without video cassette tape, it is necessary to deceive the microcomputer by turning the reel (T) table with hand.
Fast forward and rewind are not available.

Note 3 : After above mentioned operation, be sure to return the mode in the following order.

4) Pull out AC plug from wall outlet to reset the system control microcomputer.
5) Remove the tape near the end and top sensors.

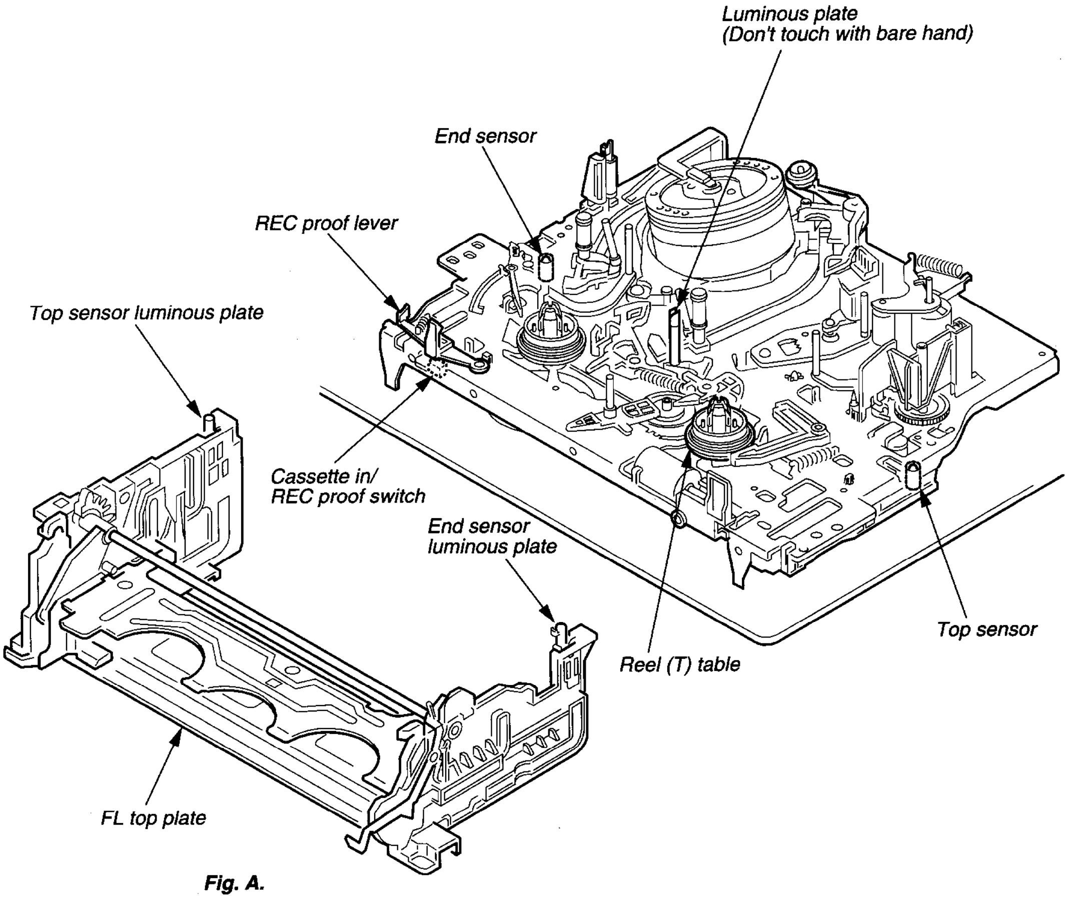

Luminous plate
(Don't touch with bare hand)
End sensor
REC proof lever
Top sensor luminous plate
Cassette in/
REC proof switch
End sensor
luminous plate
Top sensor
Reel (T) table
FL top plate
Fig. A.

Fig. 1-4

2. PERIODIC CHECK AND REPLACEMENT

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes, it is recommended that the following periodic checks and maintenance be performed.

* The following must be done after every repair regardless of how many hours the user has operated the machine.

2-1. CLEANING OF ROTATING HEAD DISK ASSEMBLY

1) Press a chamois cloth (Jig Ref. No. J-4) which has been dipped in cleaning fluid (Jig Ref. No. J-3) lightly against the rotating drum assembly, then do the cleaning by slowly rotating the rotating head disk by the hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a vertical angle to the head tip. There is a very great danger of damaging the head tip if this is done.

2-2. CLEANING OF THE TAPE MOVEMENT SYSTEM

1) Clean the surfaces which the tape contacts during its movement (tape guide, drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in cleaning fluid.

2-3. CLEANING THE DRIVE SYSTEM

1) Clean the driving parts with a cloth that has been dipped in cleaning fluid.

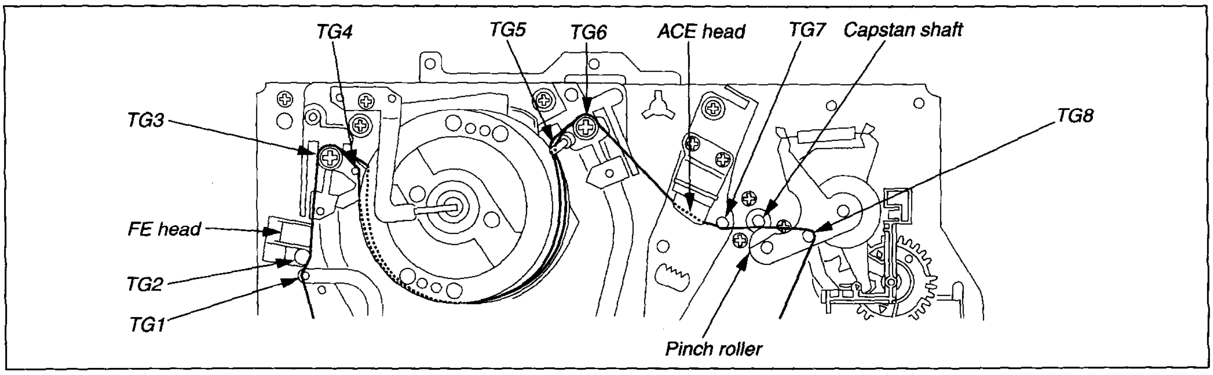


Fig. 2-1 Parts requiring cleaning

2-4. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to users' operating hours.

Maintenance & Check		500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Transportation System	Cleaning of tape transportation system	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning and degaussing of ACE assembly	○	○	○	○	○	○	○	○	○	○	
	Cleaning and degaussing of upper drum assembly	○	○	○	○	○	○	○	○	○	○	The life of the head varies, depending on operational conditions and method.
Performance Confirmation	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which causes abnormal sound.
	Measurement of FWD back tension	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to 4-1-1. Specified value : Adjust to 5.0504 to 6.5214mN•m (51.5 to 66.5g•cm) (without TC assembly*) or 3.7755 to 5.0994mN•m (38.5 to 52.0g•cm)(with TC assembly*)
	Confirmation of brake system	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to section.
	Confirmation of record and playback functions	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.
	Measurement of forward torque	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust to 4.9033 to 8.8259mN•m (50 to 90 g•cm)

Operating Hours (H)

○ : Cleaning ☆ : Confirmation

Note : On overhaul
When overhauling the unit, replace parts as indicated in the above table.

2-5. TOOLS AND FIXTURES REQUIRED FOR SERVICING

Ref. No.	Name		Part No.	Caved Jig No.	Remarks
J-1	Torque Measurement Cassette VHT-103S		J-6090-072-A		For FWD & back tension torque measurement.
	Torque Measurement Cassette VHT-404S		J-6082-012-A		For CUE and REVIEW torque measurement.
J-2	Alignment Tape	KRV-52NE* (NTSC)	8-192-605-41		Tape path, Audio azimuth, X-value adjustments
		KRV-51N2 (NTSC)	8-192-605-32		Electrical adjustments, Operation checks
		KRV-52PL (PAL)	8-192-605-46		Tape path, Audio azimuth, X-value adjustments
		KRV-51P (PAL)	8-192-605-36		Electrical adjustments, Operation checks
J-3	Cleaning fluid		Y-2031-001-0	—	
J-4	Chamois Leather		2-034-697-00	—	
J-5	Dental Mirror (With Handle) Dental Mirror (Mirror)		J-6080-029-A J-6080-030-1	SL-5052	Tape path and tape traveling adjustments or checks.
J-6	FLOIL SG-646		7-651-000-44		Net. 20g
J-7	Diamond Oil NT-68		7-661-018-18		
J-8	Screw Lock G (1401B)		7-432-114-11		
J-9	X-value adjusting driver		J-6090-073-A		X-value adjustment
J-10	Mode Selector II		J-6082-282-A	—	For S mechanism stand-alone operation
J-11	Connector Conversion Jig		J-6090-052-A	—	For S mechanism stand-alone operation
J-12	S Type Capstan Board		J-6090-075-A	—	For S mechanism stand-alone operation

* Be sure to use KRV-52NE having version number.

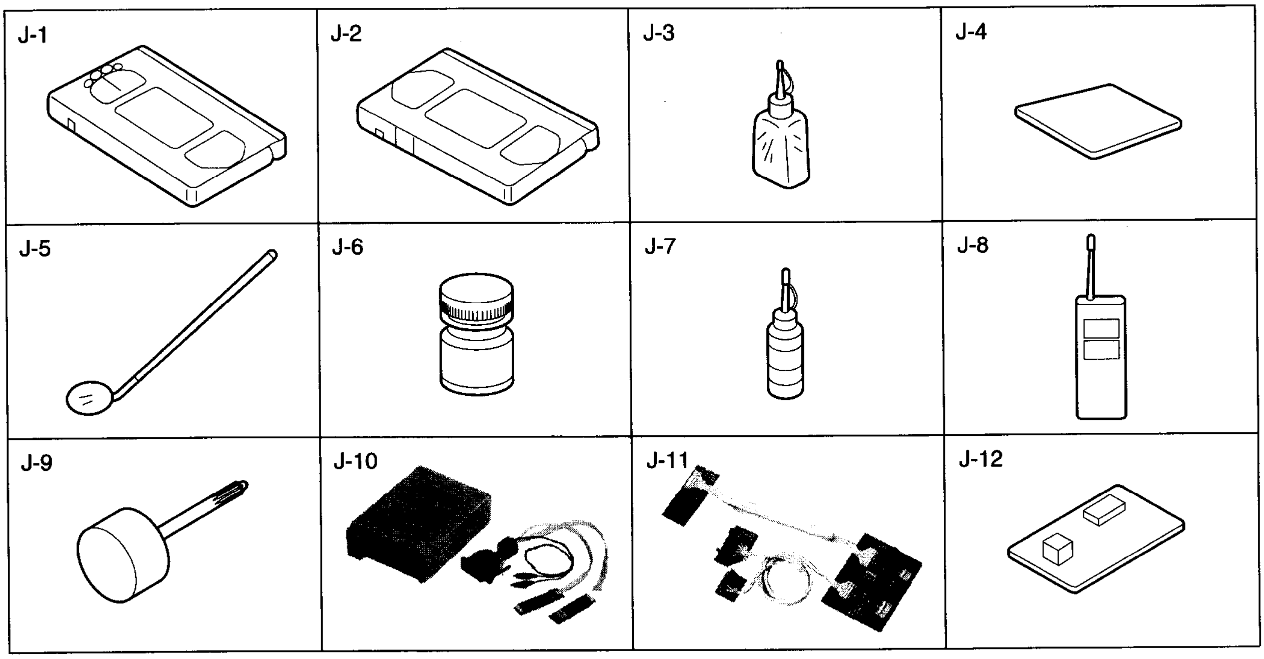


Fig. 2-2

2-6. HOW TO USE THE MODE SELECTOR II FOR ADJUSTING S TYPE MECHANISM ASSEMBLY

2-6-1. OUTLINE

To activate the VHS system S type mechanism assembly using mode selector II (J-6082-282-A), use connector conversion jig (J-6090-052-A) and the S type capstan board (J-6090-075-A). By using the connector conversion jig and the S type capstan board, the following operations are possible.

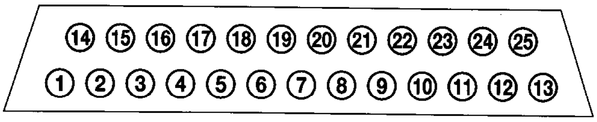
- Loading and unloading action by the loading motor.
- Normal and reverse rotation of the capstan motor.

2-6-2. PREPARATION

1) In order to drive the capstan motor, the power +5V and +12V are supplied from the Mode Selector II. Disassemble the D-SUB connector of the Mode Selector cable, then solder the following three places.

Supplied 3-pin cable	D-SUB connector of the Mode Selector II	Voltage
Pin 1 (Red index)	Pin 20	+12V
Pin 2	Pin 25	GND
Pin 3	Pin 24	+5V

- Connector pin number assignment of the D-SUB connector (From the soldering side)



- When connections are made, check that +5V and +12V are available at the 3-pin cable connector.

2) CHECKING THE SOFTWARE VERSION
Turn on the power of the Mode Selector II.
If the reading of the software version on the Mode Selector II is not 1.10 or higher, replace the new ROM (J-6082-314-A).

2-6-3. CONNECTION

1) S TYPE CAPSTAN BOARD ATTACHMENT
Replace the capstan board supplied with the connector conversion jig (J-6090-052-A) with the S type capstan board (J-6090-075-A).
2) CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE MODE SELECTOR II.
Insert the connectors of the two 6-pin cables (one is white and the other is black) and the 3-pin cable from the Mode Selector II to the corresponding connectors on the connector conversion jig (J-6090-052-A).
3) CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE S TYPE MECHANISM ASSEMBLY
With the power of the Mode Selector II turned off, insert the following two connectors to the corresponding connectors on the S type mechanism assembly.
   - 3-pin connector for the loading motor
   - 10-pin connector for the capstan motor

   Set the speed control for the minimum setting (fully counterclockwise).

2-6-4. OPERATION

1) OPERATION OF THE LOADING MOTOR ON THE S TYPE MECHANISM ASSEMBLY
   ① Select the H type mechanism assembly setting on the Mode Selector II.
   ② Operating procedures after the mechanism selection
   For the operating procedures, see pages 3 to 5 of "8mm Video Mechanical Adjustment Manual IV (TK Mechanism) Supplement-1".
   For the loading procedure, see page 4 of "VHS Mechanical Adjustment manual IV (S Mechanism)".
2) OPERATION OF THE CAPSTAN MOTOR ON THE S TYPE MECHANISM ASSEMBLY
   ① By the loading motor operation under the item 1), change the mode setting to the FF/REW mode.
   ② Turn the speed control gradually in clockwise direction, then the capstan motor starts rotating. To turn the capstan motor in desired rotating direction, change the FF/REW setting of the rotating direction switch.

2-6-5. PRECAUTIONS

- Turn the speed control only when necessary. Otherwise, hold the speed control turned at fully counterclockwise direction. If the power of the Mode Selector II is turned on with the speed control turned in clockwise direction, +12V power fails and the power of the Mode Selector II cannot be turned on.
- Although the connector conversion jig (J-6090-052-A) has rubber feet, do not make a short circuit on the bottom surface of the connector conversion jig via peripheral conductive materials.

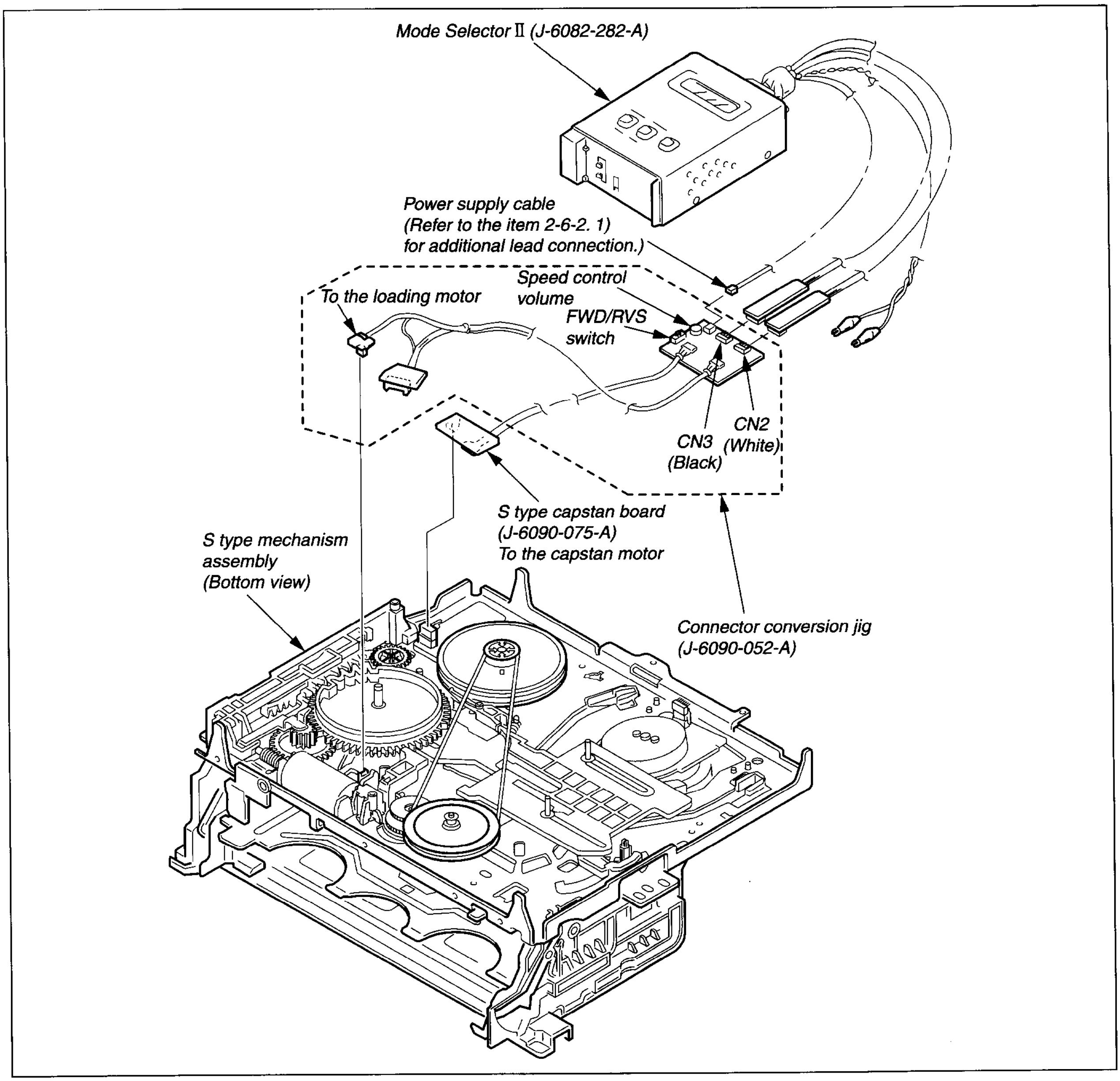

Mode Selector II (J-6082-282-A)
Power supply cable
(Refer to the item 2-6-2. 1)
for additional lead connection.)
Speed control
volume
To the loading motor
FWD/RVS
switch
CN2
(White)
CN3
(Black)
S type capstan board
(J-6090-075-A)
To the capstan motor
S type mechanism
assembly
(Bottom view)
Connector conversion jig
(J-6090-052-A)

Fig. 2-3

2-6-6. CHECKING THE MECHANISM MODE BY THE MARK CARVED ON THE SLIDER

As shown in the right figure, the mechanism mode can be identified by checking the mark carved on the slider pointed by the loading gear shaft.

Carved mark	Mode
CD	Cassette down
EJ	Eject
UL	Unload end
LE	Load end
RV	Reverse
PR	Pinch release
FP	FWD pause
FW	FWD
ST	Stop
FR	FF/REW

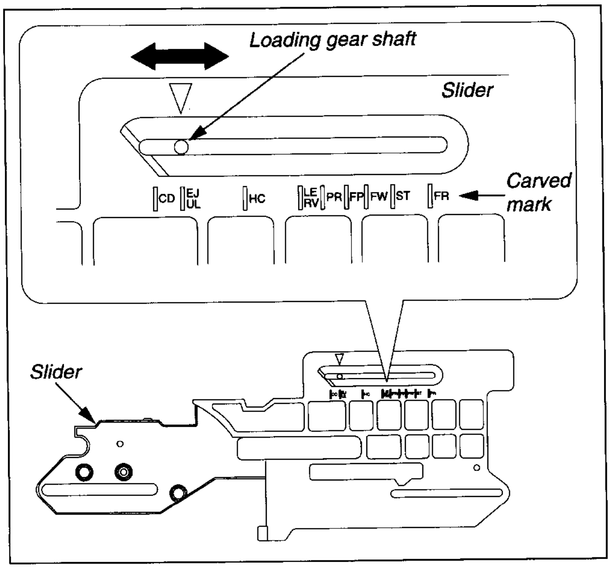
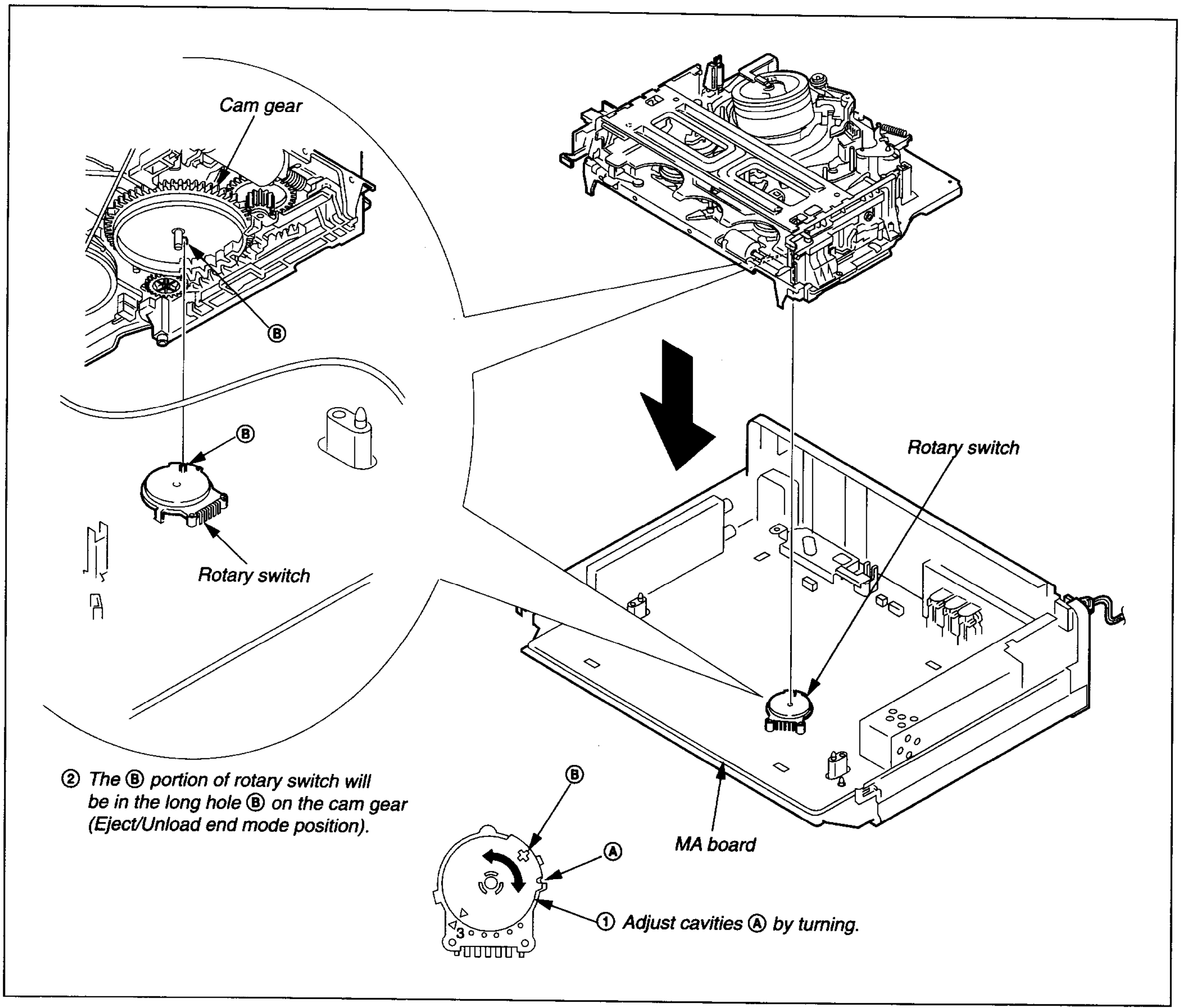

Loading gear shaft
Slider
CD
EJ
UL
HC
LE
RV
PR
FP
FW
ST
FR
Carved mark
Slider

Fig. 2-4

2-7. PHASE ADJUSTMENT ON ATTACHING S TYPE MECHANISM ASSEMBLY

As shown below, adjust the phase between the rotary switch on the MA board and the cam gear.



Cam gear
Ⓑ
Ⓑ
Rotary switch
Rotary switch
② The Ⓑ portion of rotary switch will be in the long hole Ⓑ on the cam gear (Eject/Unload end mode position).
Ⓑ
Ⓐ
MA board
① Adjust cavities Ⓐ by turning.
3

Fig. 2-5

3. MAINLY MECHANICAL PARTS REPLACEMENT

Notes:

For the removal of cabinets, printed circuit boards or the like, please refer to the "DISASSEMBLY" section on the service manual of the respective models.

To assemble the mechanical parts which are disassembled in the following sections, perform the disassembly steps in reverse, unless otherwise specified.

When replacing greased parts, grease them in the same way.

Do not oil, grease or touch with bare hands the surfaces that contacts tape of guides and brake shoes.

Install gears to engage each other.

Basically, disassembling and assembling should be done in the unthreading-end condition.

3-1. FL COMPLETE ASSEMBLY

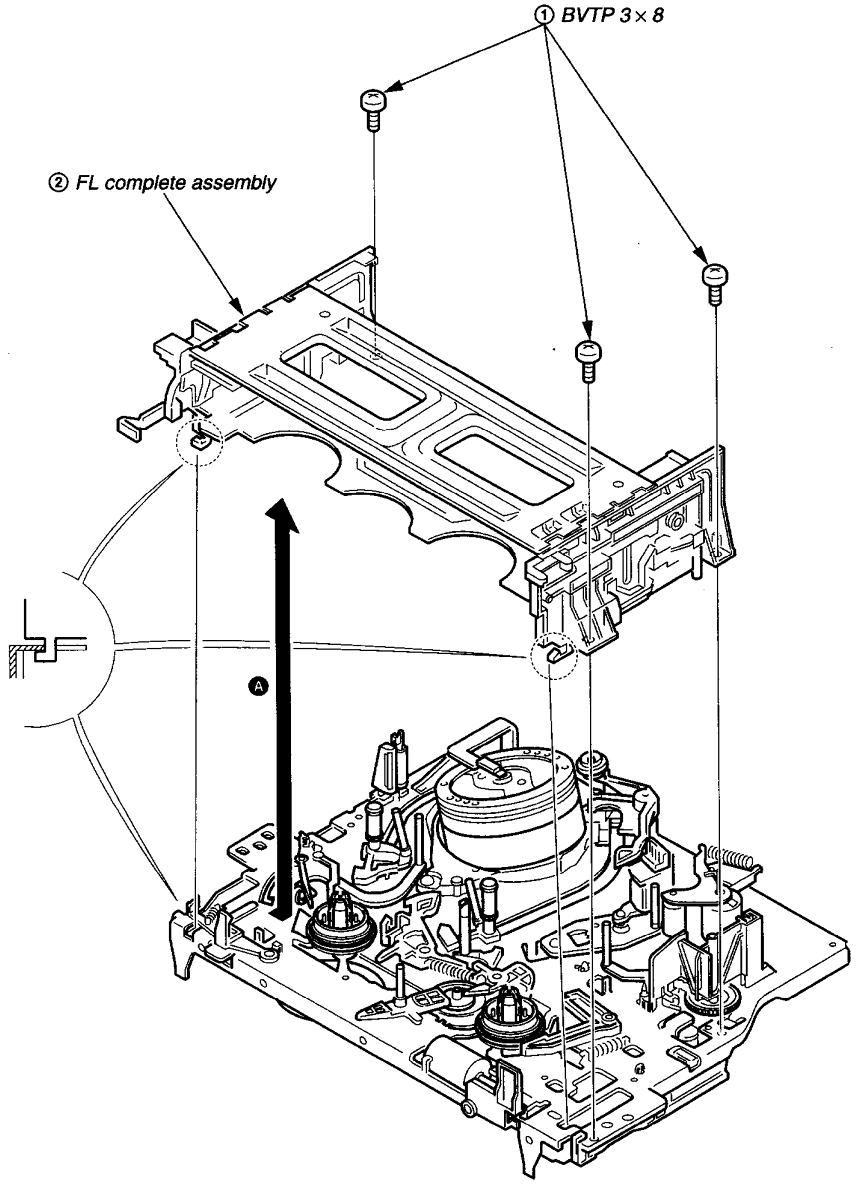
1) Remove screws (BVTP3 × 8) ①.
2) Remove FL complete assembly ② in the arrow 🅐 direction.

Note : Be careful not to damage claws on the bottom and front.

3) Remove torsion spring (deck open) ③.
4) Remove luminous plate (top sensor) ④ and luminous plate (end sensor) ⑤.

[Note on Mounting]

- When mounting FL complete assembly, first insert claws on the bottom and front not to damage.
- Keep clean top sensor and end sensor luminous plates.



Screw tightening torque
① : 0.7845 ± 0.0784N•m (8.0 ± 0.8kg•cm)

Fig. 3-1

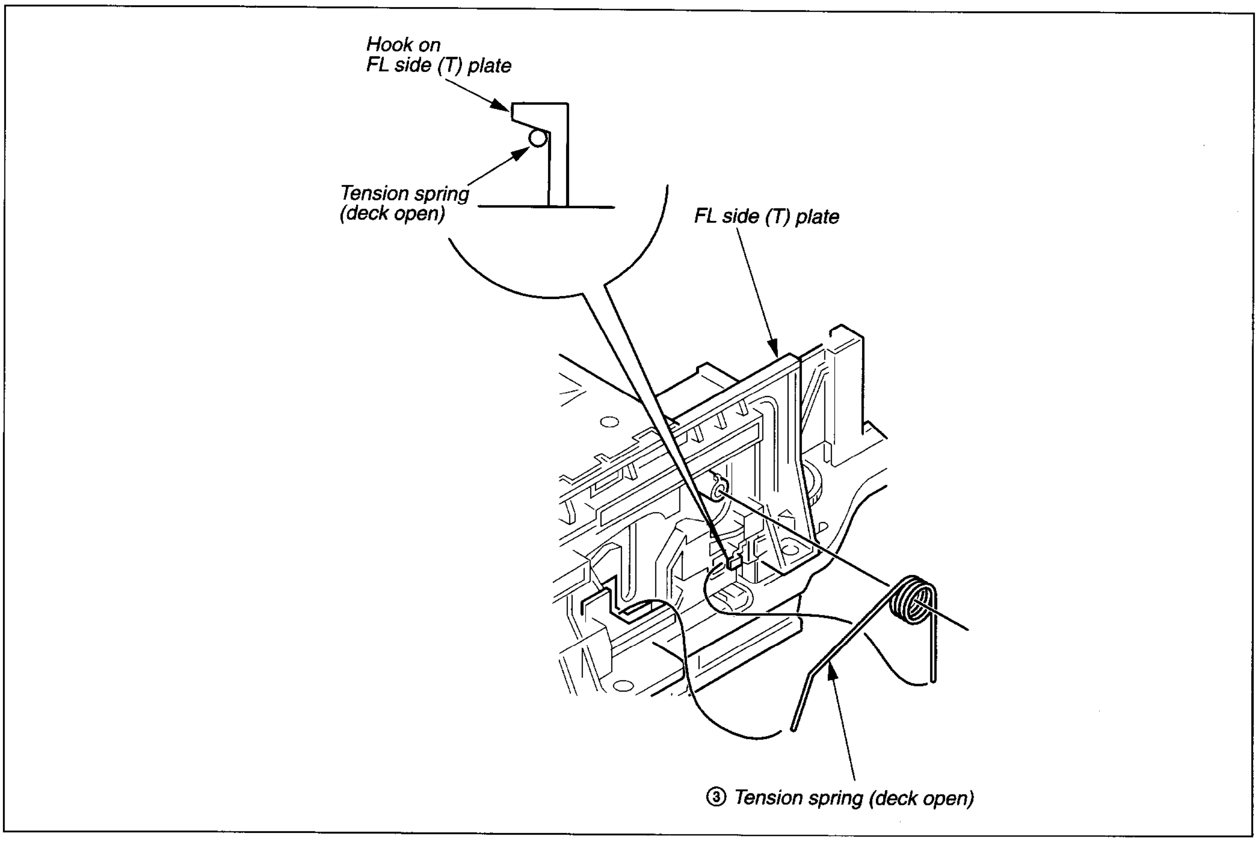

Hook on
FL side (T) plate
Tension spring
(deck open)
FL side (T) plate
③ Tension spring (deck open)

Fig. 3-2

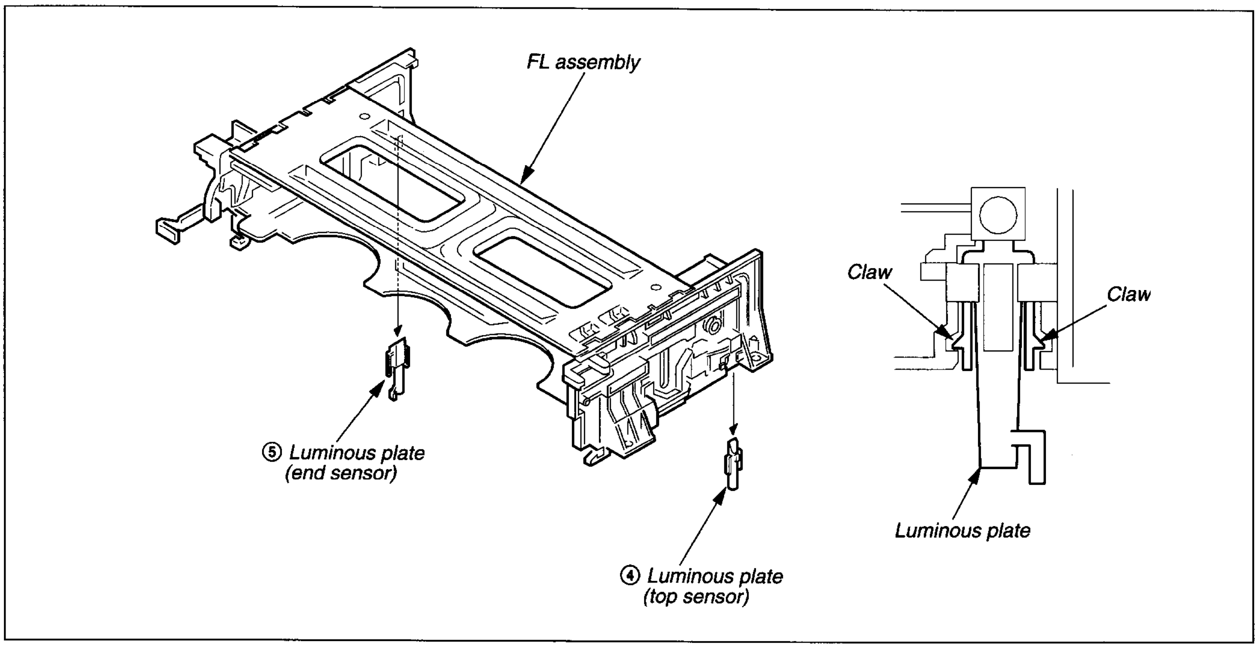

FL assembly
⑤ Luminous plate
(end sensor)
④ Luminous plate
(top sensor)
Claw
Claw
Luminous plate

Fig. 3-3

3-2. DRUM ASSEMBLY

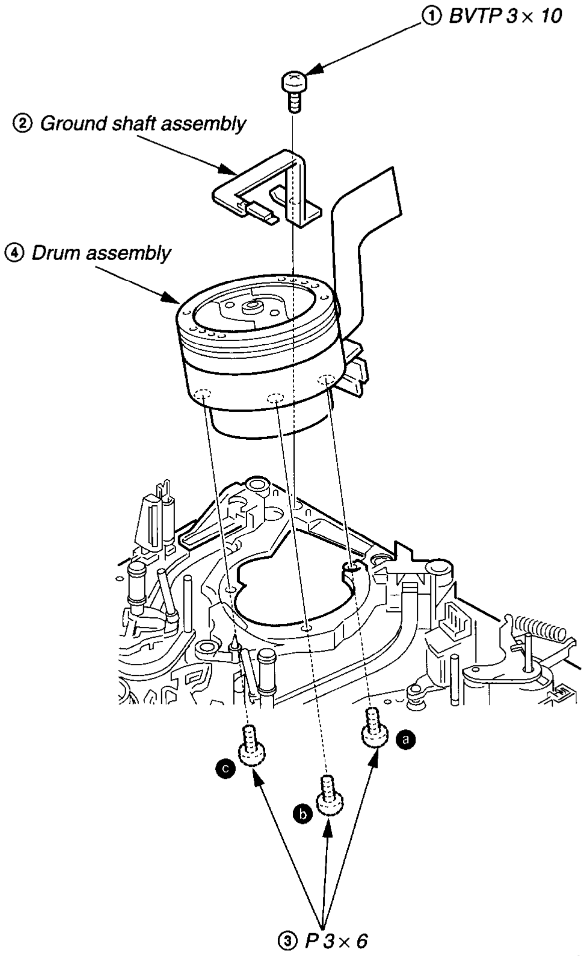
1) Remove screw (BVTP3 × 8) ①.
2) Remove ground shaft assembly ② not to touch its tip with bare hand.
3) Remove screws ③ to remove drum assembly ④.

[Notes on Mounting]

- Don't touch head chips and tip of ground shaft assembly with bare hand.
- Keep clean the surface that contacts tape of drum assembly.
- Tighten screw ③ in the order ⓐ, ⓑ, ⓒ.

[Adjusting after Mounting]

- 4-1. Tape path adjustment


① BVTP 3 × 10
② Ground shaft assembly
④ Drum assembly
ⓐ
ⓒ
ⓑ
③ P 3 × 6

Screw tightening torque
①, ③ : 0.4413 ± 0.0490N•m (4.5 ± 0.5kg•cm)

Fig. 3-4

3-3. PINCH PRESS BLOCK ASSEMBLY, TG8 ASSEMBLY AND THEIR PERIPHERY

1) Remove pinch press block assembly ① while releasing its tip from the claw of lid opener ②.
2) Remove lid opener ② while releasing claw in the arrow Ⓐ direction from mechanical chassis.
3) Remove elevator gear ③.
4) Remove TG8 assembly ④, TG8 arm gear ⑤ and TG8 arm driving gear ⑥.
5) Then remove pinch pressing gear ⑦.

[Notes on Mounting]

- When attaching pinch pressing gear ⑦ and elevator gear ③, be sure to adjust their phases as shown in Fig. A.
- Apply grease to elevator gear ⑦ and pinch shaft as shown in Fig. B.
- Don't touch surface of pinch roller with bare hand.

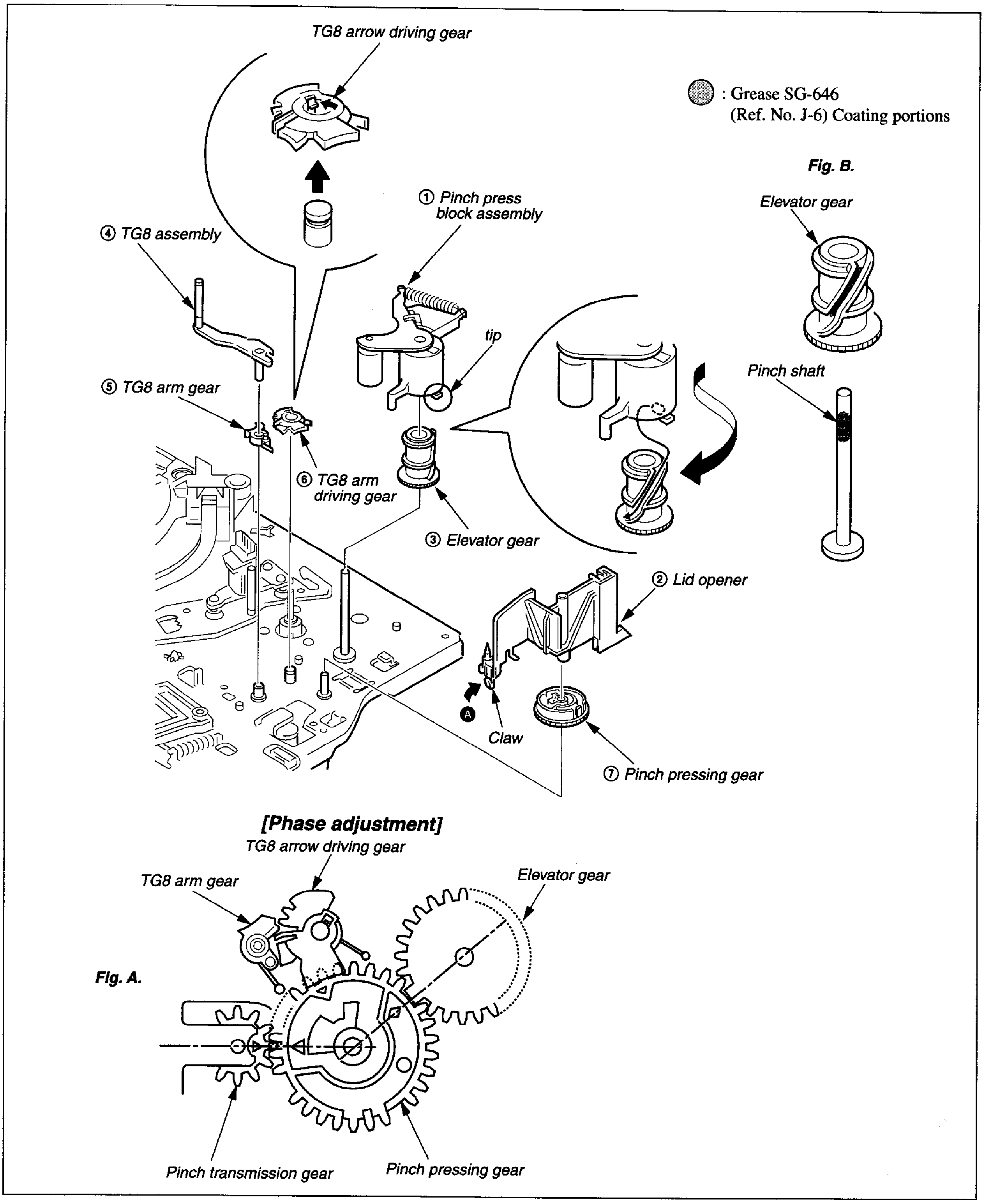

TG8 arrow driving gear
● : Grease SG-646
(Ref. No. J-6) Coating portions
Fig. B.
Elevator gear
① Pinch press block assembly
④ TG8 assembly
tip
Pinch shaft
⑤ TG8 arm gear
⑥ TG8 arm driving gear
③ Elevator gear
② Lid opener
Ⓐ
Claw
⑦ Pinch pressing gear
[Phase adjustment]
TG8 arrow driving gear
TG8 arm gear
Elevator gear
Fig. A.
Pinch transmission gear
Pinch pressing gear

Fig. 3-5

3-4. RUBBER BELT, CAPSTAN MOTOR

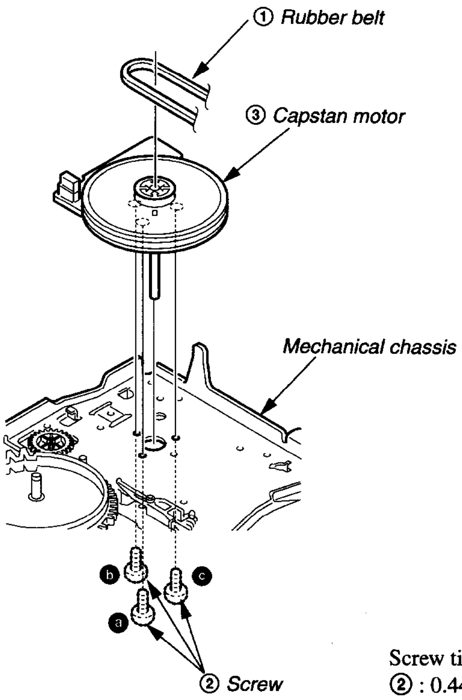
1) Remove rubber belt ①.
2) Remove screws ② to pull out capstan motor ③.

[Notes on Mounting]

- Attach rubber belt not to twist it.
- Don't touch capstan motor with bare hand to keep clean capstan motor.
- Tighten screws ② in the order ⓐ, ⓑ, ⓒ.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.


① Rubber belt
③ Capstan motor
Mechanical chassis
ⓑ
ⓒ
ⓐ
② Screw

Screw tightening torque
② : 0.4413 ± 0.0490N•m (4.5 ± 0.5kg•cm)

Fig. 3-6

3-5. ACE HEAD BLOCK ASSEMBLY

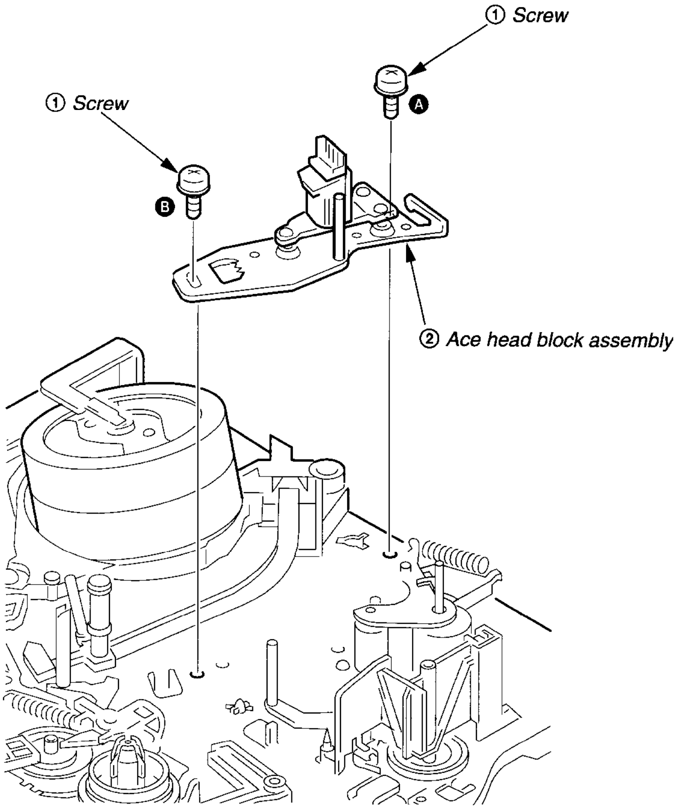
1) Remove screws ① to remove ACE head block assembly ②.

[Notes on Mounting]

- Don't touch capstan motor with bare hand to keep clean capstan motor.
- On tightening screws ①, first, tighten in the order 🅐, 🅑, next loosen 🅑 180 degrees or more and perform adjustments. After adjustments tighten with torque screwdriver (torque; 0.29 ± 0.29 N•m (3.0 ± 0.3kg•cm)).

[Adjustment after Mounting]

- 4-1. Tape path adjustment.



Screw tightening torque
① : 0.7845 ± 0.0784N•m (8.0 ± 0.8kg•cm)

Fig. 3-7

3-6. FEH ASSEMBLY

1) While putting the boss out from mechanical chassis, turn FEH assembly ① in the arrow Ⓐ direction and pull out FEH assembly above.
2) Slide FE head ② out from FEH holder not to break claw (Recorder only).
3) Remove TG2 shaft ③ by pushing with a screwdriver covered with cloth or the like not to scratch the surface.

[Note on Mounting]

- Don't touch FE head and TG2 shaft with bare hand.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

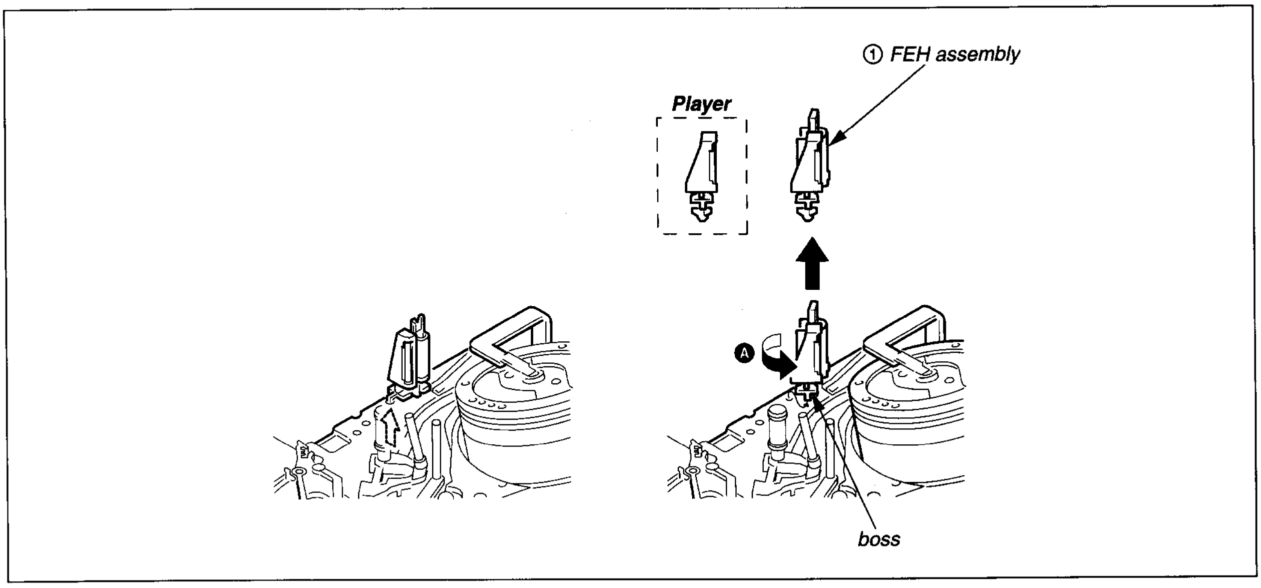

① FEH assembly
Player
Ⓐ
boss

Fig. 3-8

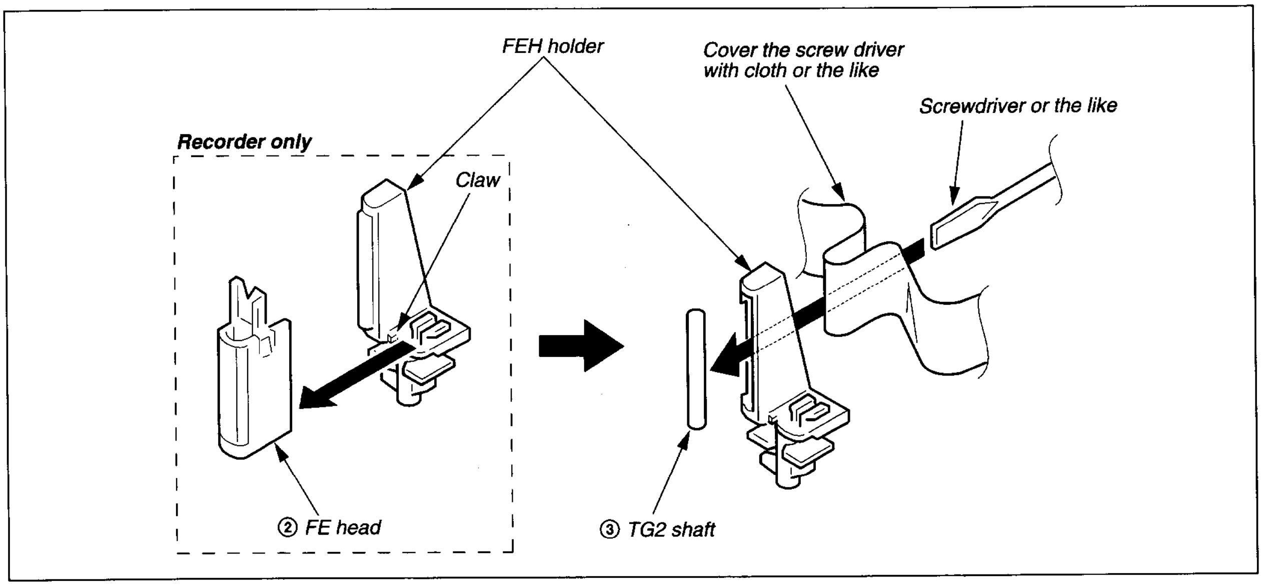

FEH holder
Cover the screw driver with cloth or the like
Screwdriver or the like
Recorder only
Claw
② FE head
③ TG2 shaft

Fig. 3-9

3-7. REC PROOF LEVER

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove tension spring (REC proof) ①.
3) Remove REC proof lever ② in the arrow **B** by pushing claw in the arrow **A** direction.

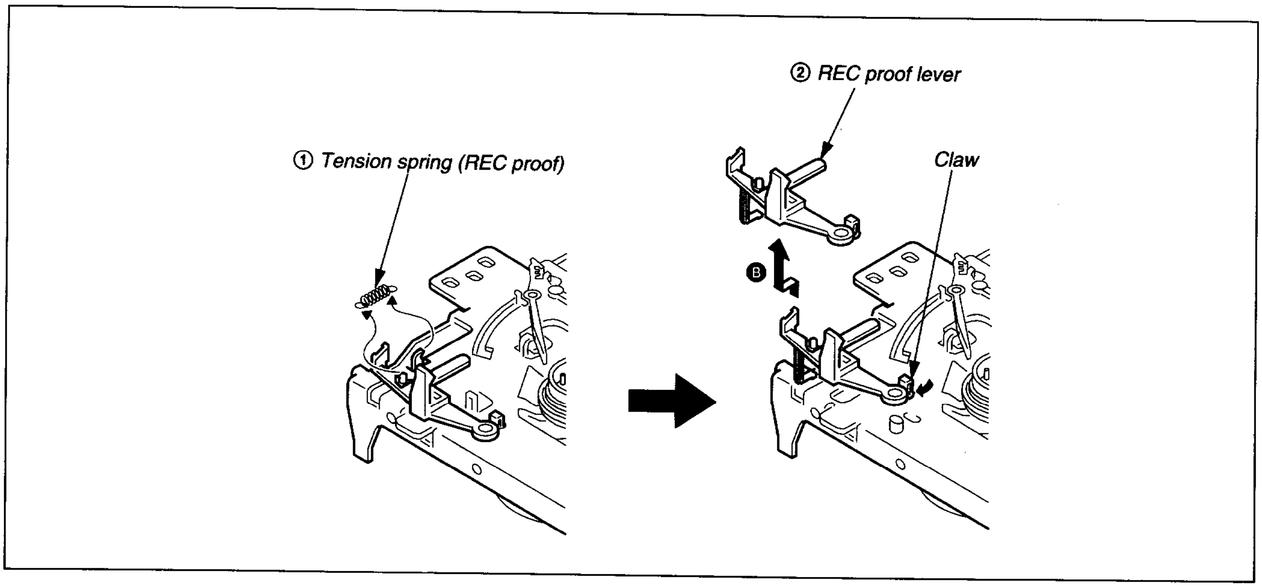

② REC proof lever
① Tension spring (REC proof)
Claw
B

Fig. 3-10

3-8. RVS BRAKE ARM ASSEMBLY

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove extension spring (RVS brake) ①.
3) Turn RVS brake arm assembly ② in the arrow **A** direction and remove it in the arrow **B**.

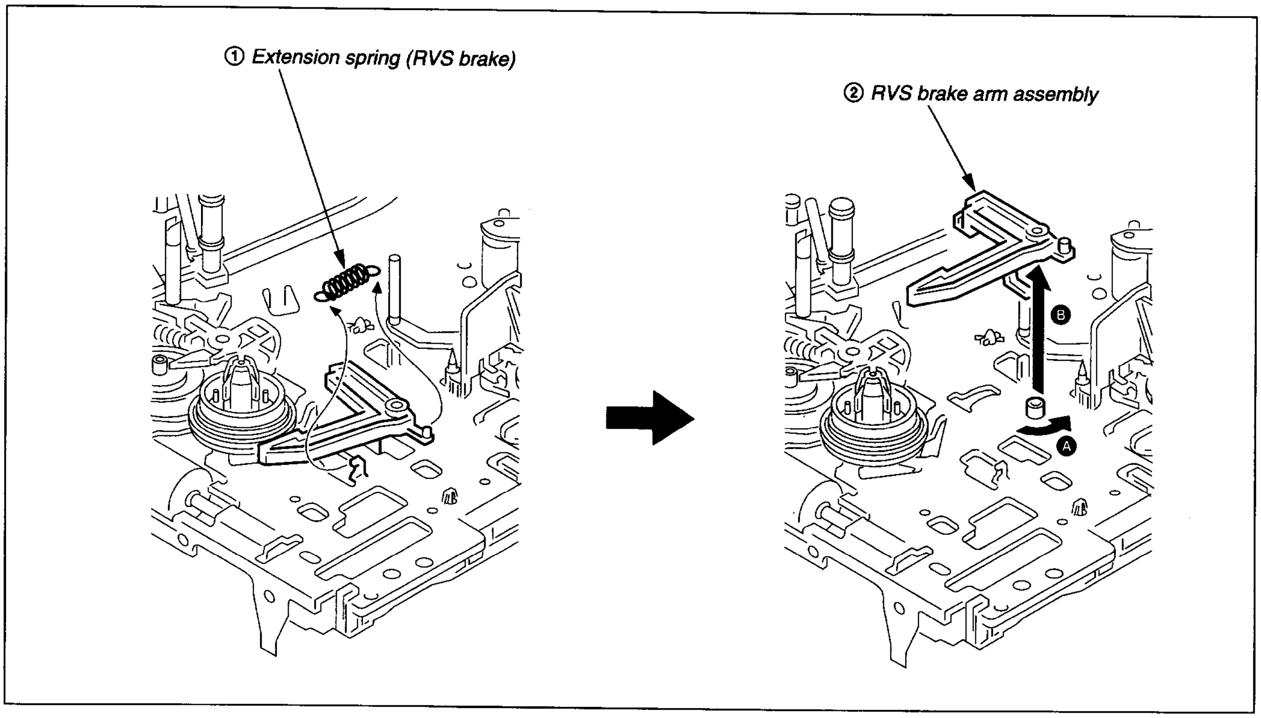
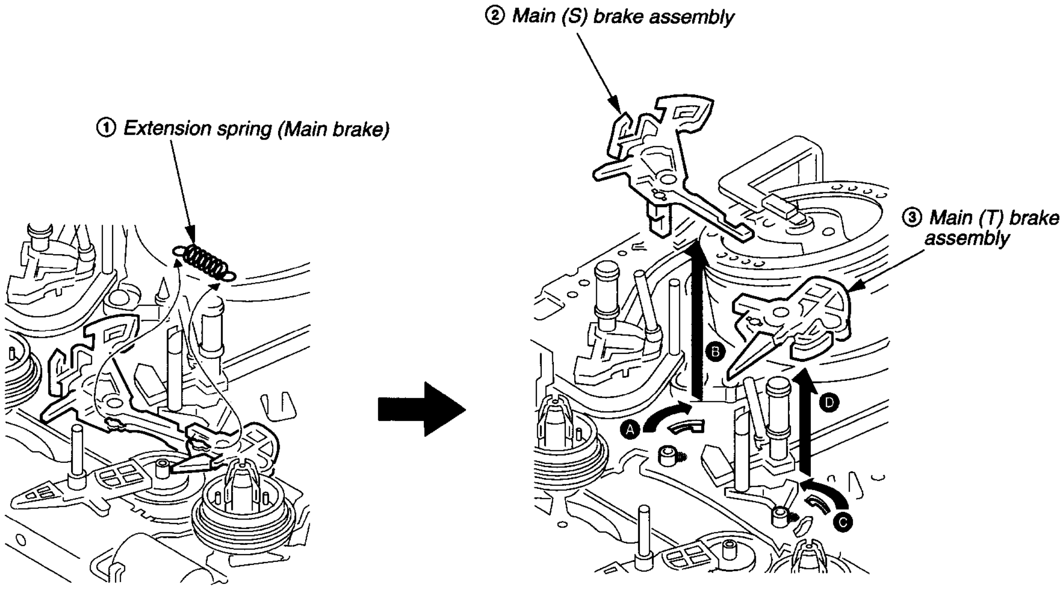

① Extension spring (RVS brake)
② RVS brake arm assembly
B
A

Fig. 3-11

3-9. MAIN (S) AND MAIN (T) BRAKE ASSEMBLIES

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove extension spring (main brake) ①.
3) Turn main (S) brake assembly ② in the arrow Ⓐ direction and remove it in the arrow Ⓑ.
4) Turn main (T) brake assembly ③ in the arrow Ⓒ direction and remove it in the arrow Ⓓ.


② Main (S) brake assembly
① Extension spring (Main brake)
③ Main (T) brake assembly
Ⓑ
Ⓓ
Ⓐ
Ⓒ

● : Grease SG-646
(Ref. No. J-6) Coating portions

Fig. 3-12

3-10. REEL (T) TABLE (BLACK)

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove stopper washer ① to pull reel (T) table ② out.
3) Remove thrust washer ③.

[Note on Mounting]

- Before attaching, confirm the oil is applied at the top of reel (T) shaft.

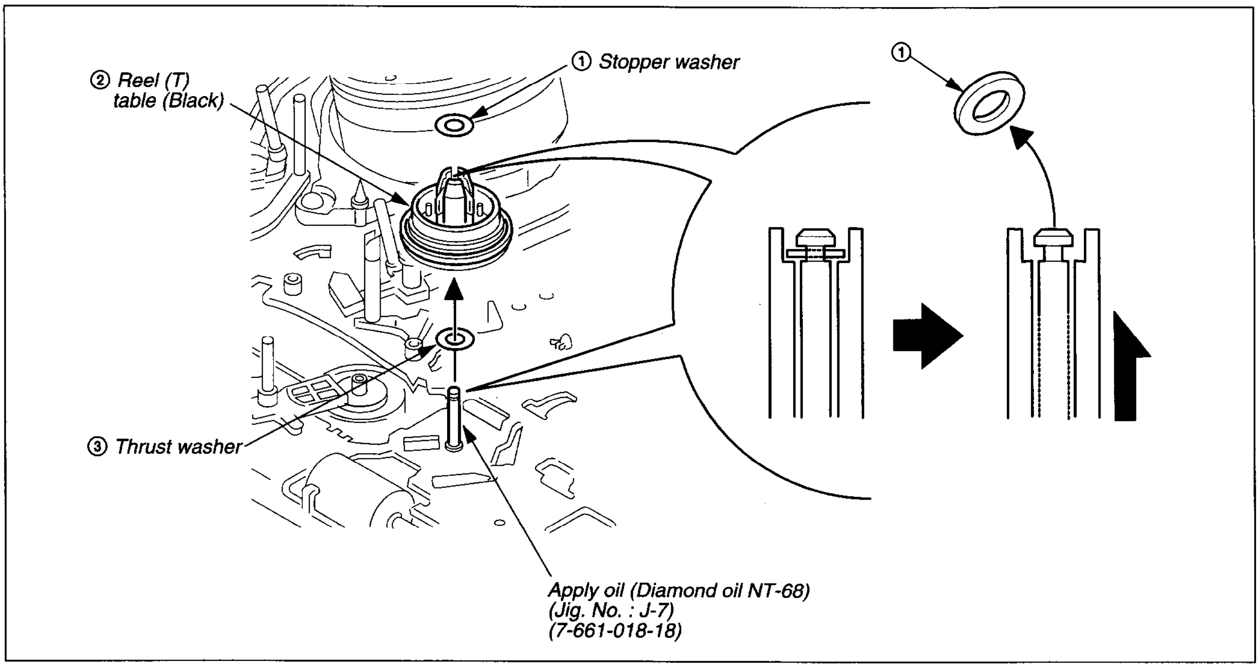

② Reel (T) table (Black)
① Stopper washer
①
③ Thrust washer
Apply oil (Diamond oil NT-68) (Jig. No. : J-7) (7-661-018-18)

Fig. 3-13

3-11. PENDULUM ARM ASSEMBLY

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove main (S) and main (T) brake assemblies. (Refer to 3-9.)
3) While releasing claws from the pendulum arm shaft in the arrow A direction, pull out pendulum arm assembly ①.

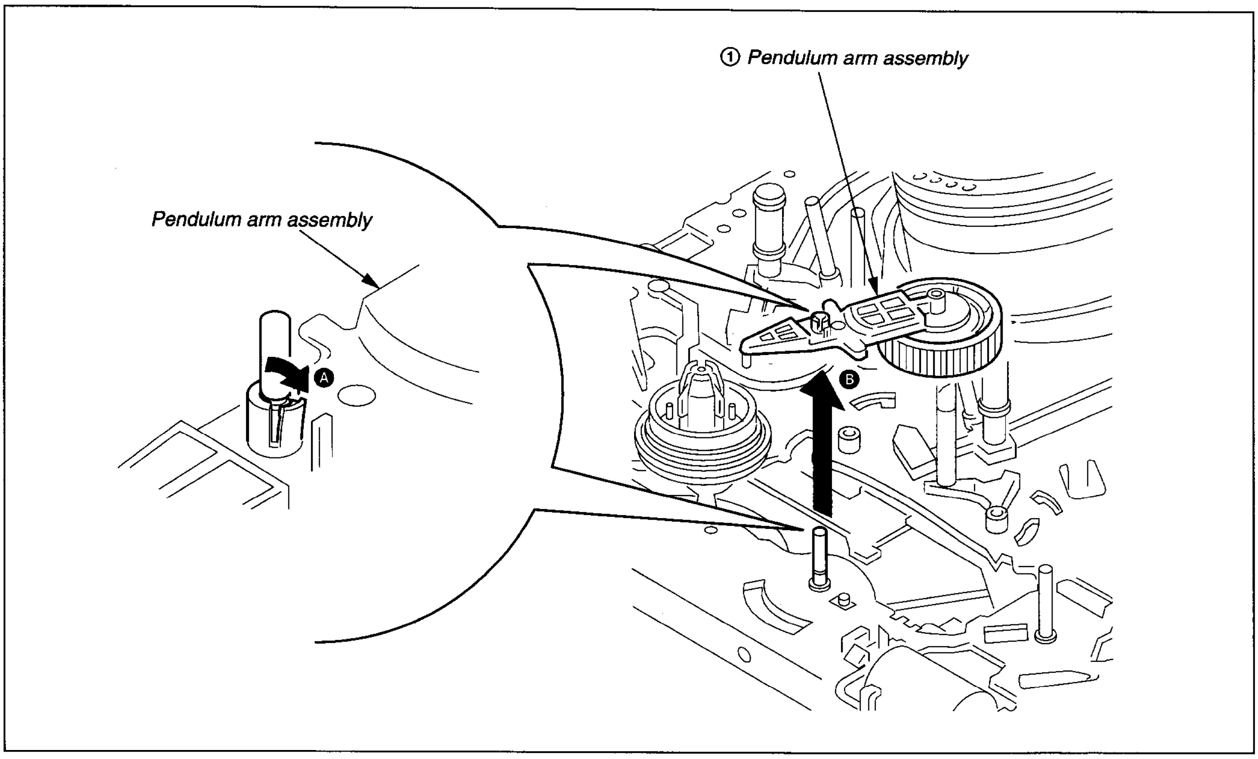

① Pendulum arm assembly
Pendulum arm assembly
A
B

Fig. 3-14

3-12. FL SLIDER BLOCK ASSEMBLY

1) Remove FL complete assembly. (Refer to 3-1.)
2) Set the mechanism deck upside down.
3) Remove a screw (BVTP 3 × 8) ① and then retainer plate ② is getting out of place.
4) Slide FL slider block assembly ③ off in the arrow Ⓐ direction and raise it up.

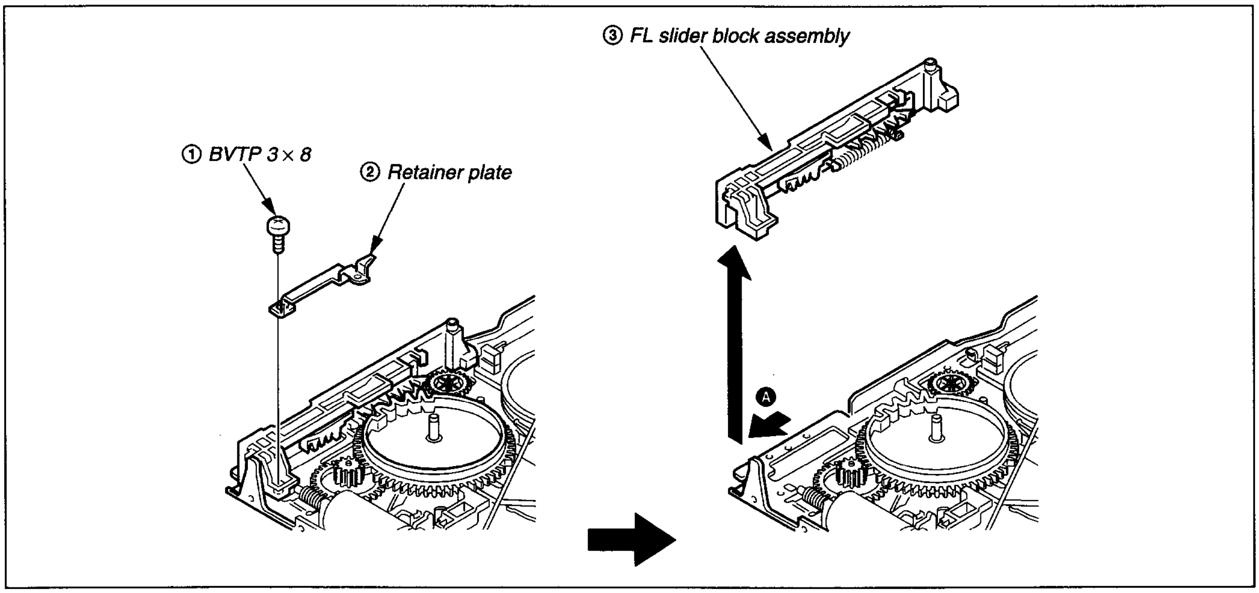

③ FL slider block assembly
① BVTP 3 × 8
② Retainer plate
Ⓐ

Fig. 3-15

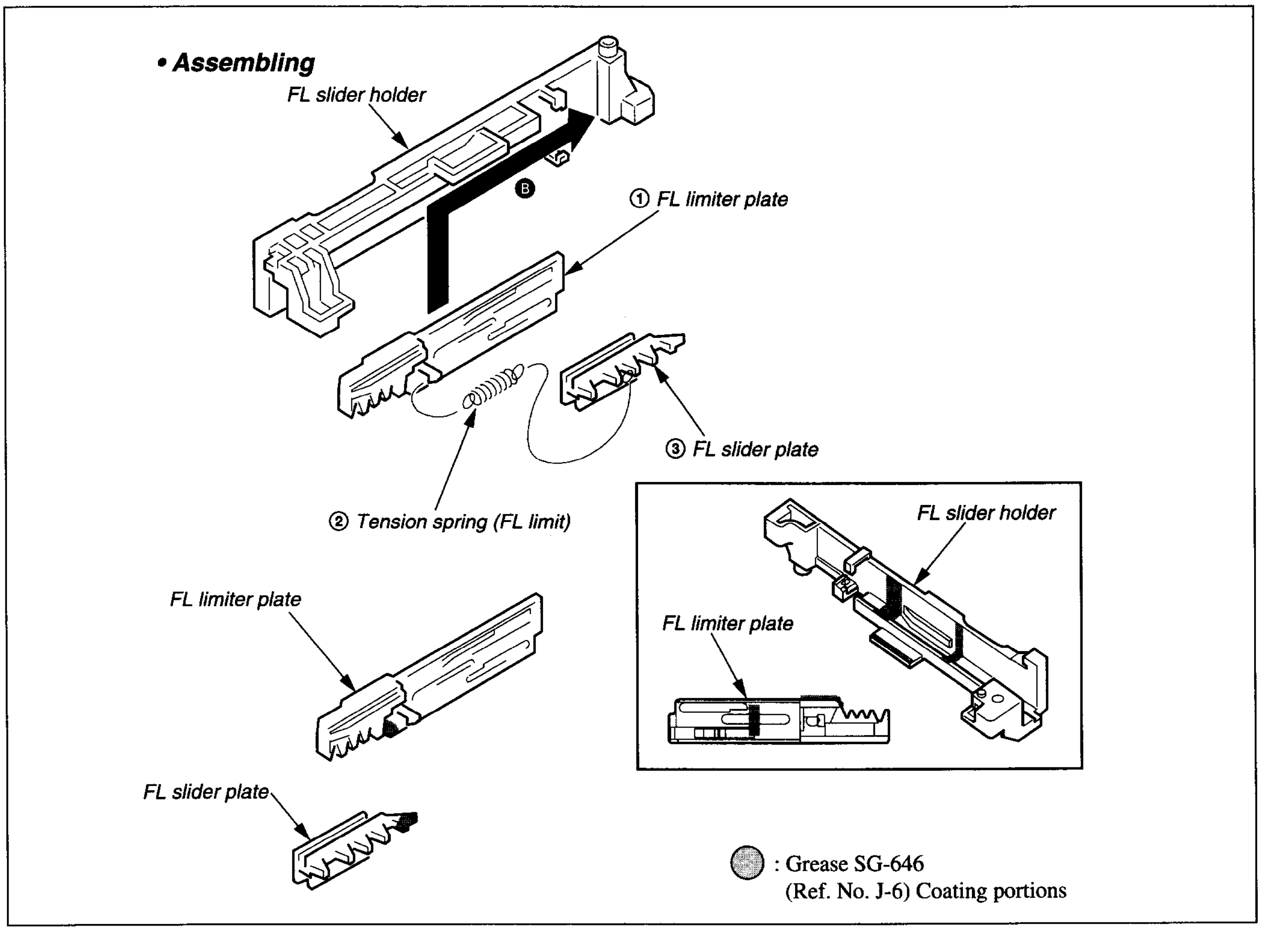

• Assembling
FL slider holder
Ⓑ
① FL limiter plate
③ FL slider plate
② Tension spring (FL limit)
FL slider holder
FL limiter plate
FL limiter plate
FL slider plate
● : Grease SG-646
(Ref. No. J-6) Coating portions

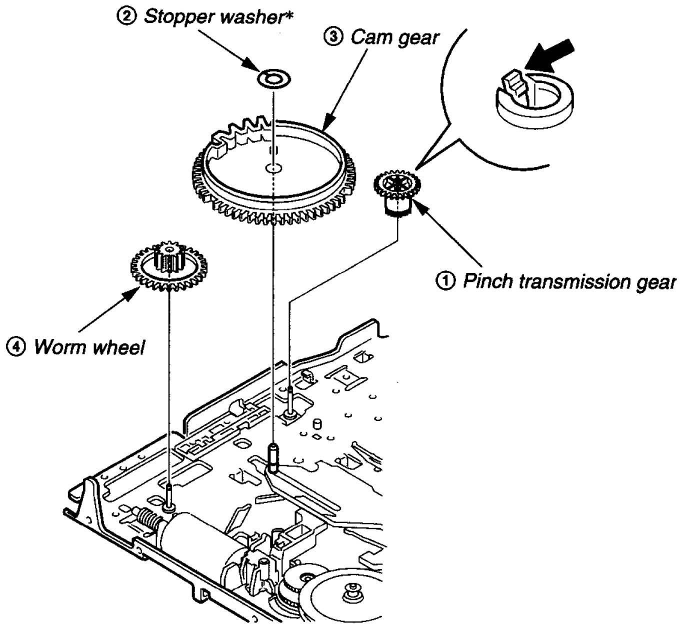
Fig. 3-16

3-13. PINCH TRANSMISSION GEAR, CAM GEAR, WORM WHEEL

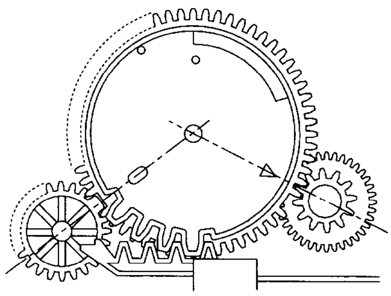
1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove FL slider block assembly. (Refer to 3-12.)
3) Remove pinch transmission gear ① by putting off its claw from shaft.
4) Remove stopper washer ②* to pull out cam gear ③.
5) Remove worm wheel ③ by putting off its claw from shaft.

[Note on Mounting]

- Before attaching cam gear ③, confirm that the specified locations are coated with grease SG-646 (Ref. No. J-6).
- Adjust the phase of gears each other.

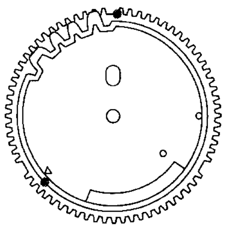


• Phase adjustment

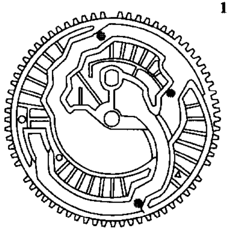


● : Grease SG-646 (Ref. No. J-6) Coating portions

[Top]



[Bottom]



* Once remove stopper washer ②, don't use it again. Replace it with new one.

Fig. 3-17

3-14. CAPSTAN BRAKE ASSEMBLY, CAPSTAN BRAKE SHAFT

1) Remove rubber belt. (Refer to 3-4.)
2) Remove cap brake spring ①.
3) Remove capstan brake assembly ② by putting off claw of capstan brake shaft ③.
4) Set the mechanical chassis bottom side down.
5) While pushing the boss of capstan brake shaft ③, turn it clockwise to remove it.

[Note on Mounting]

- Don't touch shoe of capstan brake assembly with bare hand.

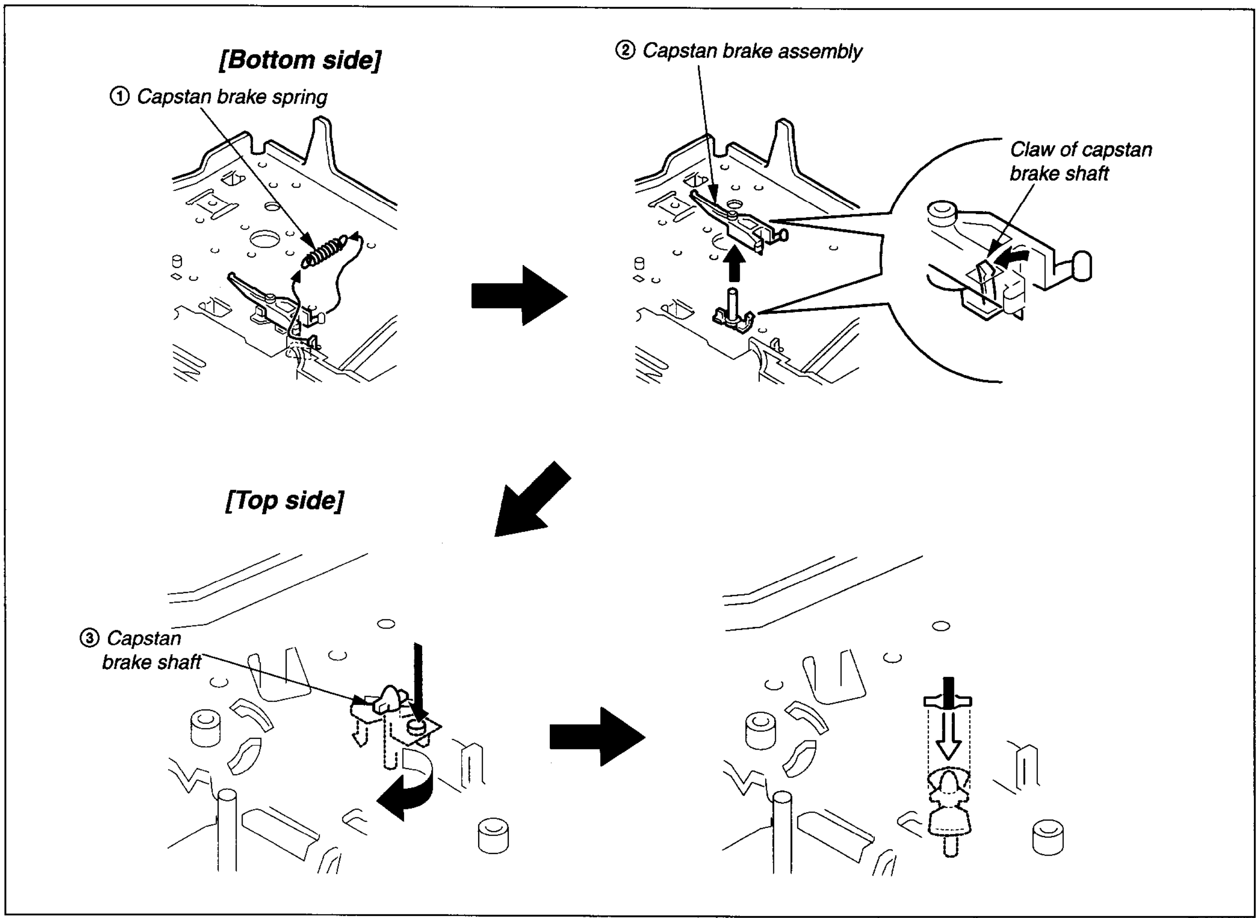

[Bottom side]
① Capstan brake spring
② Capstan brake assembly
Claw of capstan brake shaft
[Top side]
③ Capstan brake shaft

Fig. 3-18

3-15. FL SLIDER GUIDE

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove FL slider block assembly. (Refer to 3-12.)
3) Remove FL slider guide ① while pushing claws in the arrow Ⓐ direction.

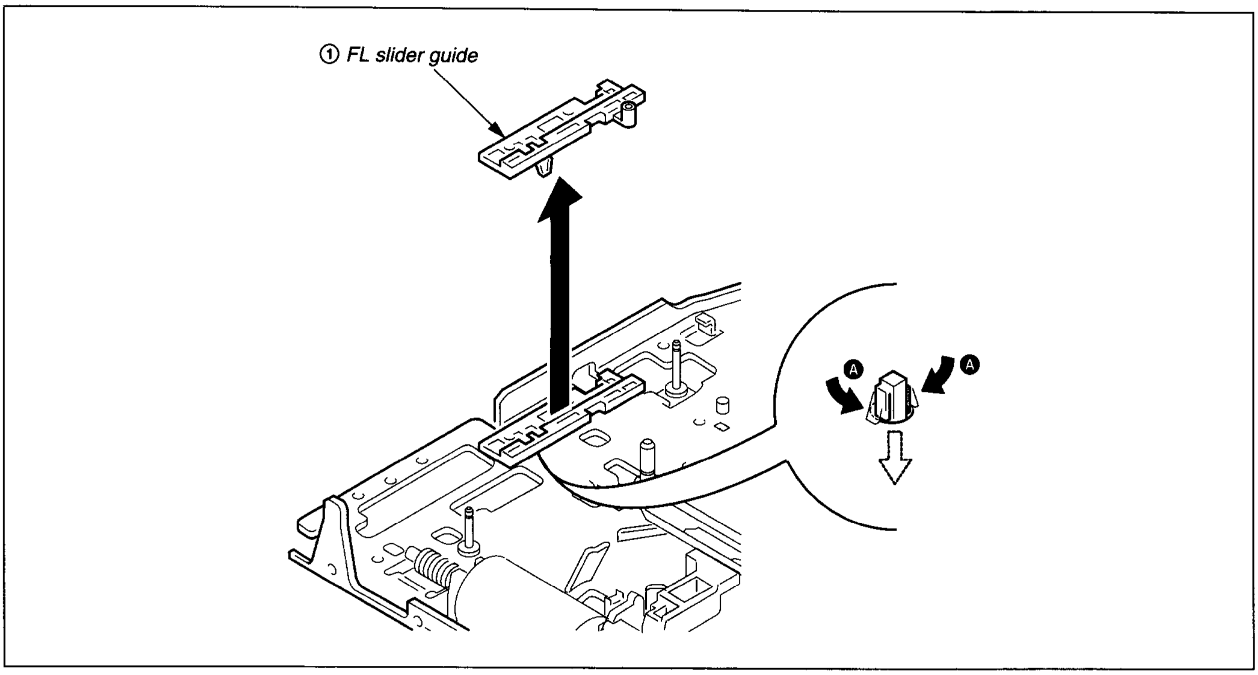


Fig. 3-19

3-16. SLIDER

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove cam gear. (Refer to 3-13.)
5) Remove stopper washers ① and remove slider ② in the arrow direction.

[Note on Mounting]

- Before attaching slider ②, confirm the specified locations are coated with grease SG-646 (Ref. No. J-6).
- When attaching slider ②, adjust "Δ" mark on slider to loading gear (T) shaft as shown in Fig. A.

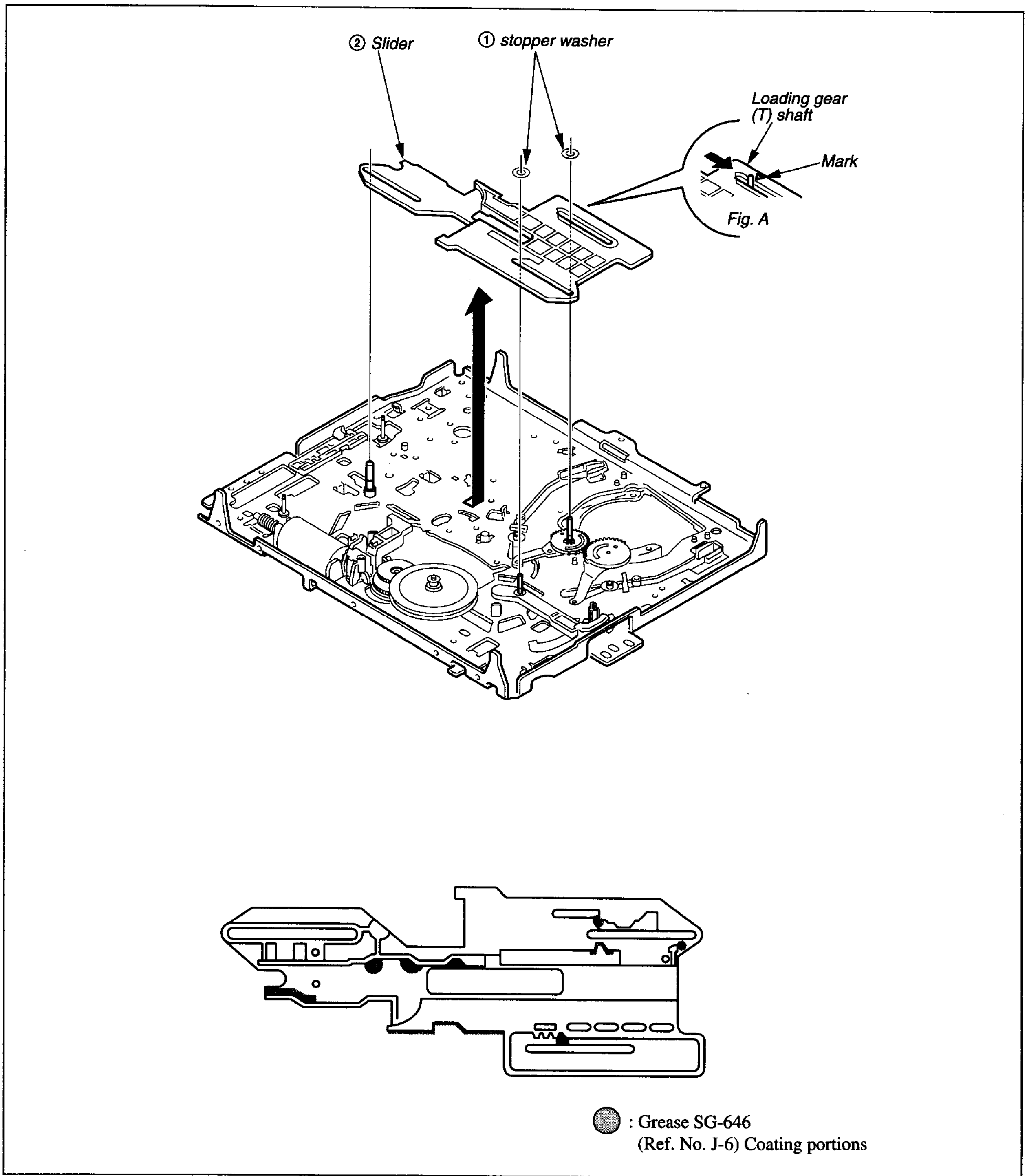

② Slider
① stopper washer
Loading gear (T) shaft
Mark
Fig. A
● : Grease SG-646
(Ref. No. J-6) Coating portions

Fig. 3-20

3-17. TG1 DRIVING ARM

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove cam gear. (Refer to 3-13.)
5) Remove slider. (Refer to 3-16.)
6) Remove spring (power tension) ① from TG1 driving arm ②.
7) Remove TG1 driving arm ② by turning it in the arrow 🅐 to 🅑 direction.

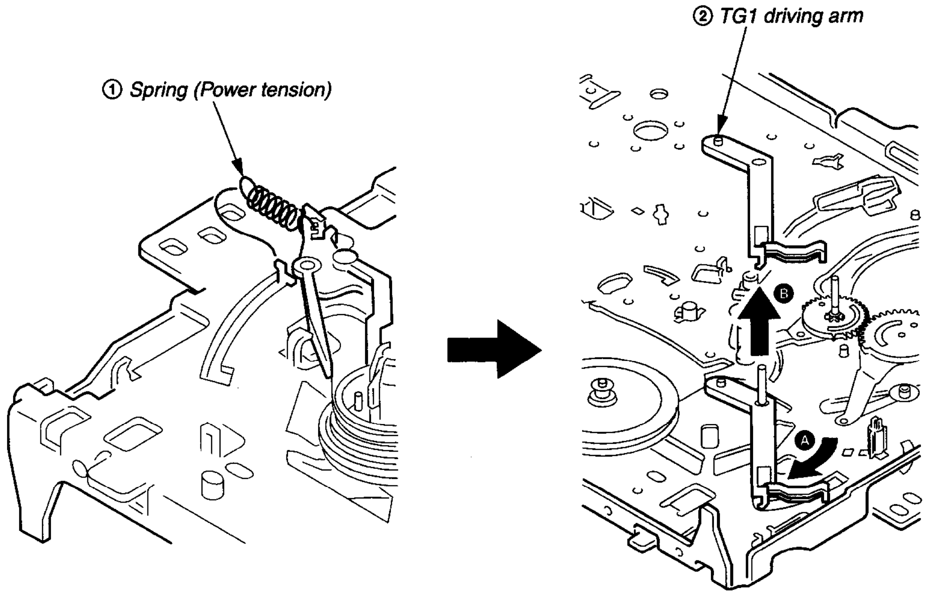

② TG1 driving arm
① Spring (Power tension)
🅑
🅐

Fig. 3-21

3-18. LOADING (T) AND LOADING (S) GEAR ASSEMBLIES

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove cam gear. (Refer to 3-13.)
5) Remove slider. (Refer to 3-16.)
6) Remove loading (T) gear assembly ① and loading (S) gear assembly ② in the arrow direction.

[Note on Mounting]

- When attaching them, be sure to adjust the phase each other.

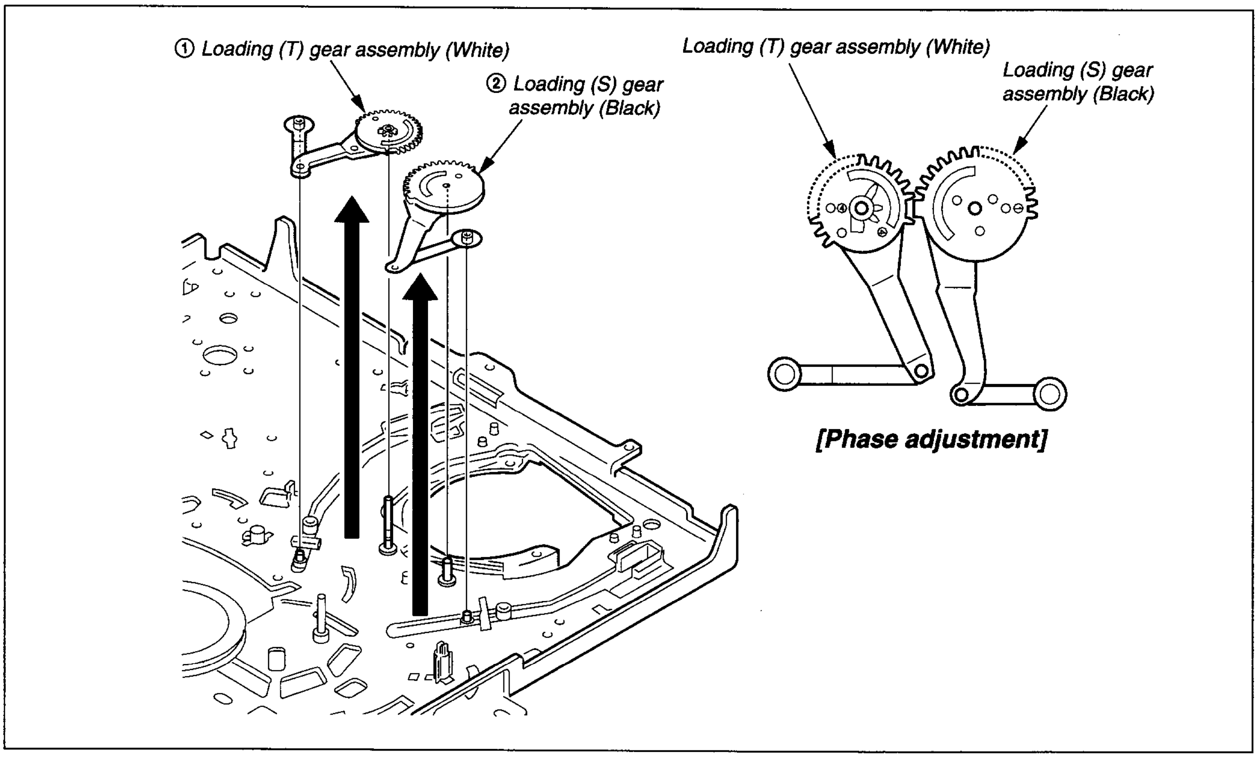

① Loading (T) gear assembly (White)
② Loading (S) gear assembly (Black)
Loading (T) gear assembly (White)
Loading (S) gear assembly (Black)
[Phase adjustment]

Fig. 3-22

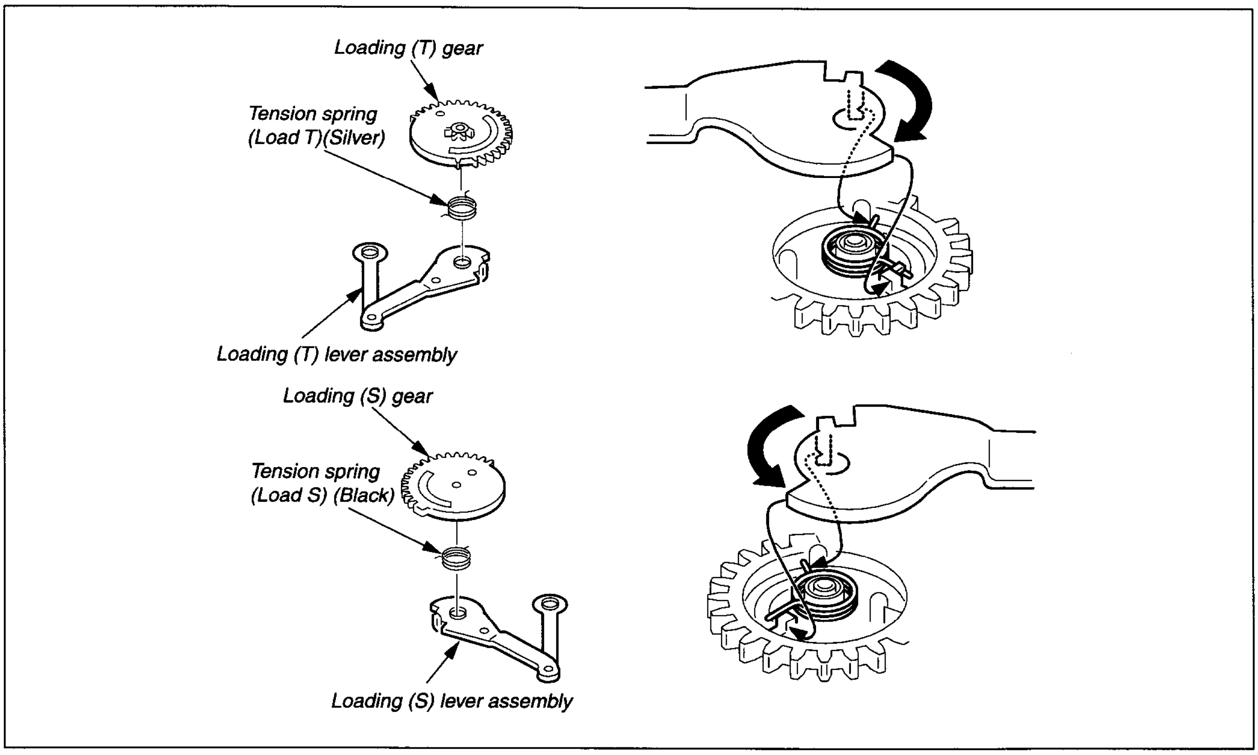

Loading (T) gear
Tension spring (Load T)(Silver)
Loading (T) lever assembly
Loading (S) gear
Tension spring (Load S) (Black)
Loading (S) lever assembly

Fig. 3-23

3-19. PULLEY GEAR ASSEMBLY, CLUTCH GEAR

1) Remove rubber belt. (Refer to 3-4.)
2) Remove stopper washer ①.
3) Remove pulley gear assembly ② with clutch gear ③.

[Note on Mounting]

- When attaching them, don't insert strongly.

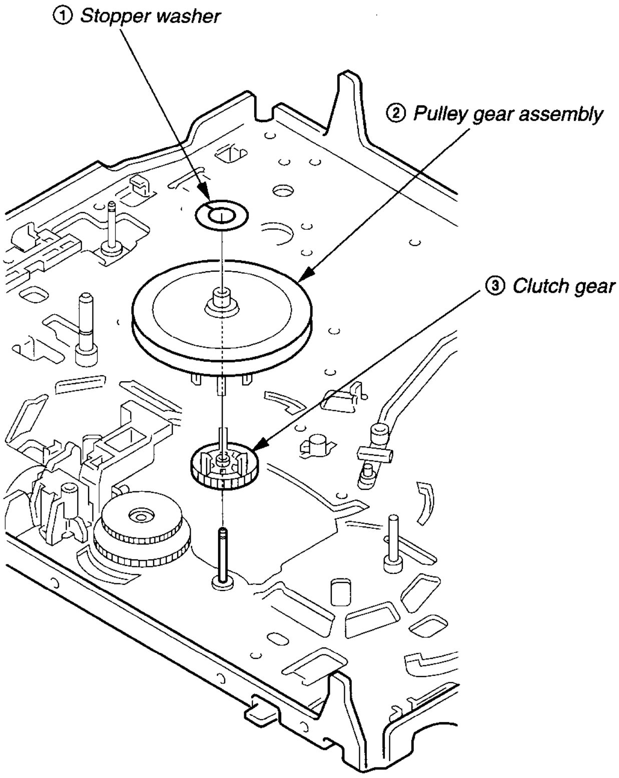

① Stopper washer
② Pulley gear assembly
③ Clutch gear

Fig. 3-24

3-20. REEL DIRECT ASSEMBLY

1) Remove rubber belt. (Refer to 3-5.)
2) Remove pulley gear assembly with clutch gear. (Refer to 3-19.)
3) Remove stopper washer ① and reel direct assembly ②.

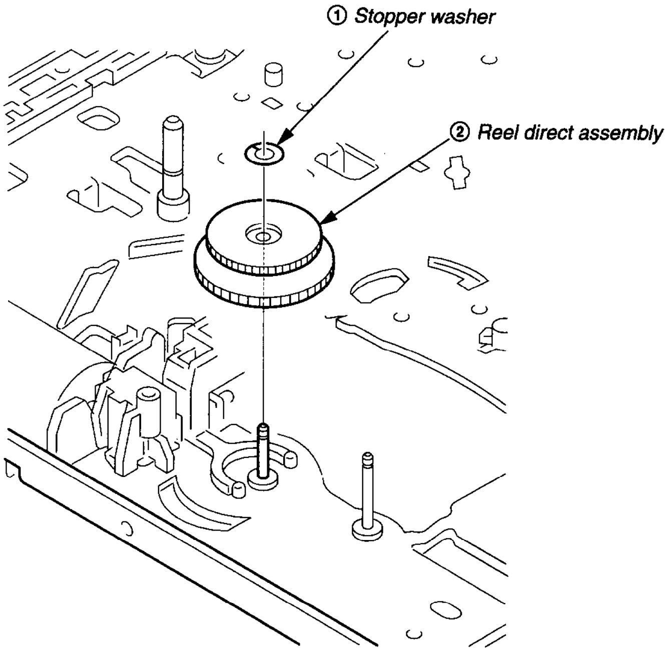

① Stopper washer
② Reel direct assembly

Fig. 3-25

3-21. CASSETTE GUIDE PLATE

1) Remove a screw (P 3 × 8) ① and remove cassette guide plate ②.

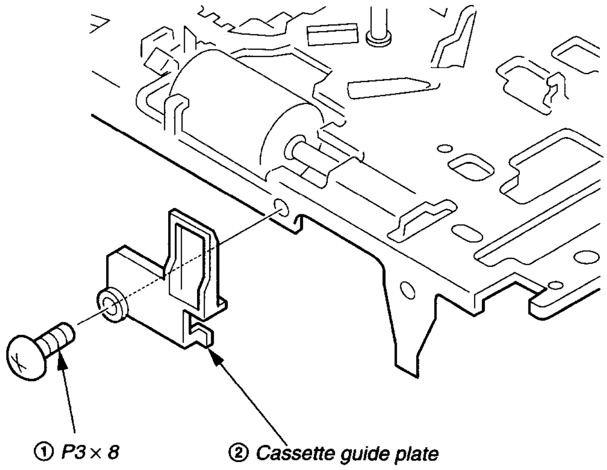

① P3 × 8
② Cassette guide plate

Fig. 3-26

3-23. DRUM BASE, HC ROLLER BLOCK ASSEMBLY

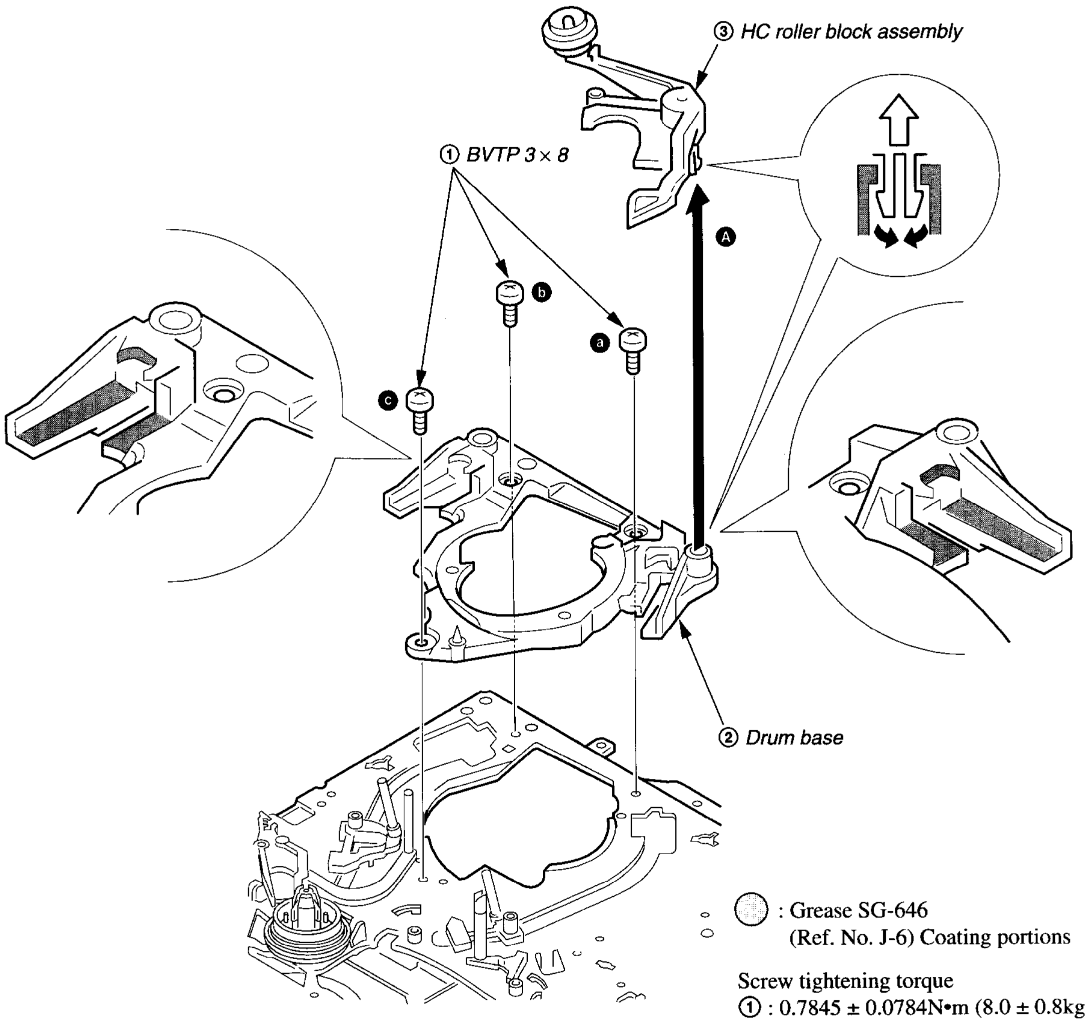
1) Remove the drum assembly. (Refer to 3-2.)
2) Remove screws BVTP 3 × 8 ①.
3) Remove drum base ②.
4) Pull out HC roller assembly ③ straight in the arrow Ⓐ direction.

[Note on Mounting]

- Before attaching drum base ②, confirm the specified locations are coated with grease SG-646 (Ref. No. J-6).
- Tightening screws ① in the order ⓐ to ⓑ to ⓒ.

[Adjustment after Mounting]

- 4-1. Tape path adjustment



○ : Grease SG-646 (Ref. No. J-6) Coating portions

Screw tightening torque
① : 0.7845 ± 0.0784N•m (8.0 ± 0.8kg•cm)

Fig. 3-28

3-24. SHUTTLE (S) AND SHUTTLE (T) BLOCK ASSEMBLIES

1. Guide Roller Assemblies

1) Turn them counterclockwise, then they are out of place, also springs.

[Note on Mounting]

Don't touch the surface that contacts tape with bare hand.

[Adjustment after Mounting]

- 4-1. Tape path adjustment

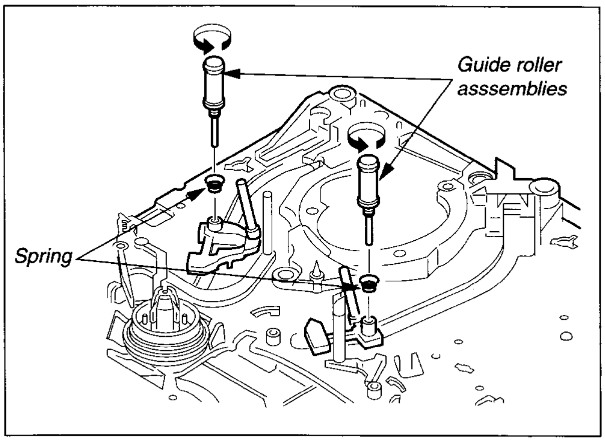

Guide roller asssemblies
Spring

Fig. 3-29

2. Shuttle (S) and Shuttle (T) Assemblies

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove the drum assembly. (Refer to 3-2.)
3) Remove rubber belt. (Refer to 3-4.)
4) Remove FL slider block assembly. (Refer to 3-12.)
5) Remove cam gear. (Refer to 3-13.)
6) Remove slider. (Refer to 3-16.)
7) Remove loading (T) gear assembly and loading (S) gear assembly. (Refer to 3-18.)
8) Remove drum base. (Refer to 3-23.)
9) Remove shuttle (S) or shuttle (T) assembly by slide them backward.

[Note on Mounting]

Don't touch the surface that contacts tape with bare hand.

[Adjustment after Mounting]

- 4-1. Tape path adjustment

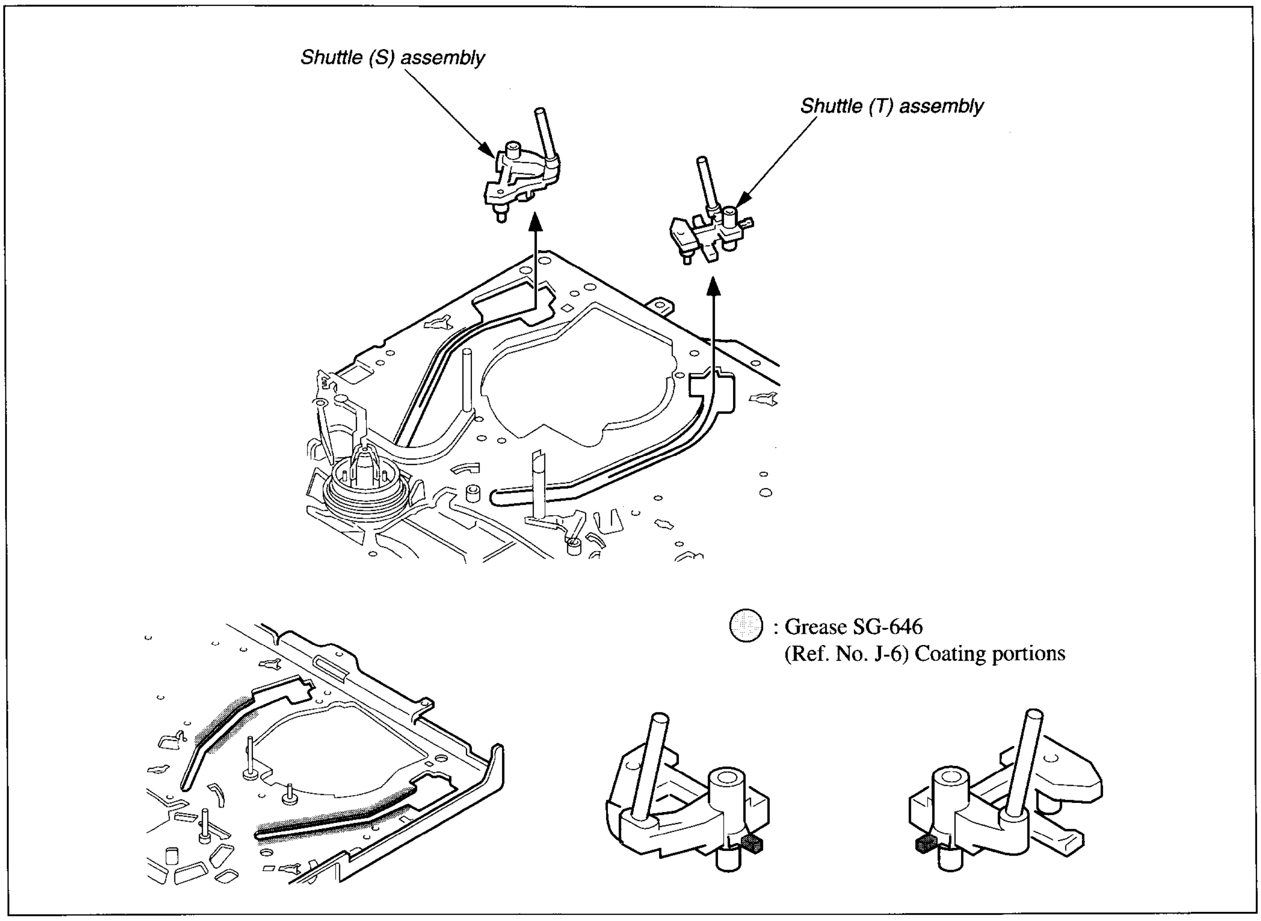

Shuttle (S) assembly
Shuttle (T) assembly
: Grease SG-646
(Ref. No. J-6) Coating portions

Fig. 3-30

3-25. TG1 ASSEMBLY, REEL (S) TABLE

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove spring (power tension) ① from TG1 driving arm.
3) While spreading claws on the bottom in the arrows Ⓐ direction, pull TG1 assembly ② out.
4) While spreading claws on the top in the arrows Ⓑ direction, pull reel (S) table ③ out.
5) Remove thrust washer ④.

[Note on Mounting]
Don't touch the surface that contacts tape and the braking surface of TG1 assembly with bare hand.

[Adjustment after Mounting]
- 4-1. Tape path adjustment

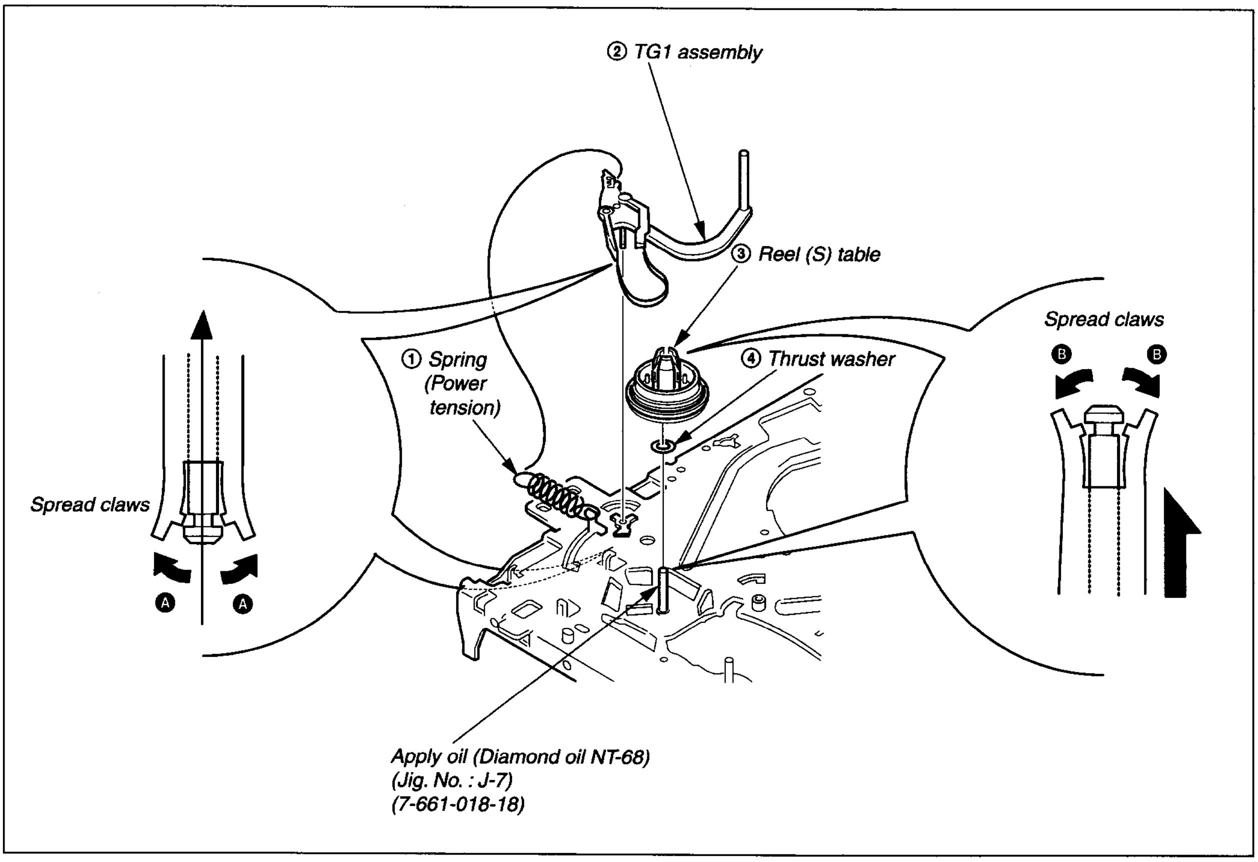

② TG1 assembly
③ Reel (S) table
① Spring (Power tension)
④ Thrust washer
Spread claws
Ⓐ
Ⓐ
Spread claws
Ⓑ
Ⓑ
Apply oil (Diamond oil NT-68) (Jig. No. : J-7) (7-661-018-18)

Fig. 3-31

3-26. TG1 FULCRUM BOSS

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove TG1 assembly. (Refer to 3-25.)
3) Turn TG1 fulcrum boss counterclockwise and pull it out.

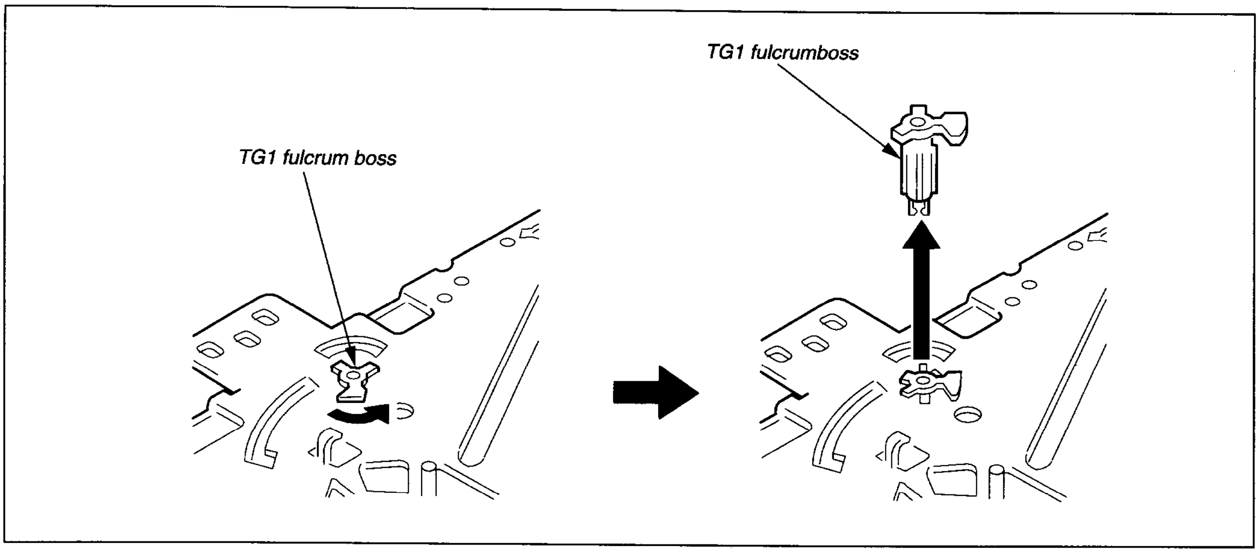

TG1 fulcrumboss
TG1 fulcrum boss

Fig. 3-32

3-27. LUMINOUS PLATE

1) Remove main (T) brake assembly. (Refer to 3-9.)
2) Turn luminous plate clockwise while raising a portion Ⓐ slightly and pull out it.

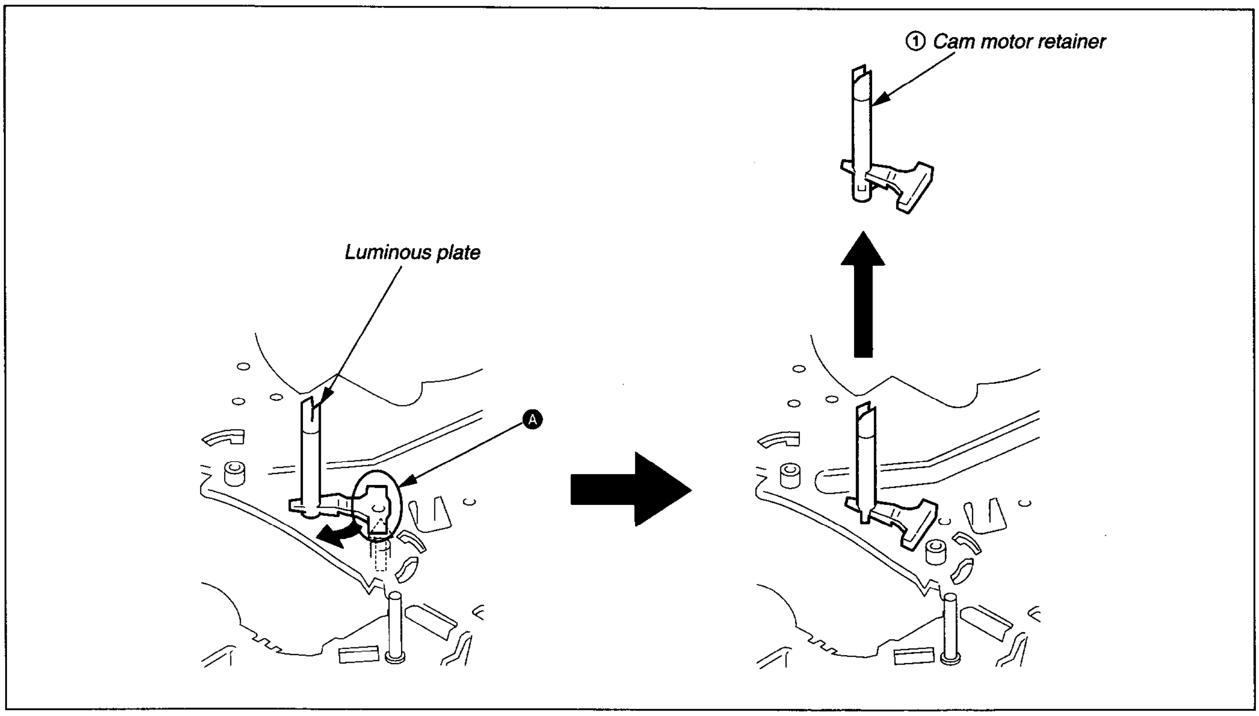

① Cam motor retainer
Luminous plate
A

Fig. 3-33

4. ADJUSTMENT

4-1. TAPE PATH ADJUSTMENT

The "Tape path" refers to the route of the tape from the supply reel disk to the take-up reel disc via the video heads.

Each component part of the tape transport system particularly the surface of parts which make direct contact with the tape must always be kept clean, free of dust, oil, scratches and so forth.

The tape path system is factory pre-adjusted, when parts of the tape transport system are replaced, be sure to make the required adjustments as precisely as possible in order to ensure stable tape transport.

4-1-1. TENSION REGULATOR (TG1) POSITION/ TENSION ADJUSTMENT (Fig. 4-1)

Purpose: stabilizes contact of the video head and the tape to maintain the tension of the tape so that it feeds at a constant level.

• Position adjustment

Mode	Threading is completed without a cassette loaded (Playback)
Adjustment locations	Eccentric pin of TG1 band assembly

[Adjustment Method]

1) Allow the unit to go through the threading procedure without a cassette loaded.
2) Set the unit to play back, then turn the eccentric pin so that the tip of tension arm goes to the left side line carved on the mechanical chassis. (Fig. A)
3) After adjustment, go through the loading procedure once more without a cassette loaded, then check the position of the tension arm.

• Tension adjustment

Mode	Playback (SP)
Measuring instrument/tool	Torque cassette VHT-103S (Ref. No. J-1)
Adjustment locations	Position for hooking the tension spring
Specified value	5.05 to 6.52 mN•m (51.5 to 66.5g•cm) (without TC assembly) 3.78 to 5.10 mN•m (38.5 to 52.0g•cm) (with TC assembly)

[Adjustment Method]

1) Playback the torque cassette.
2) Check that the center value deviation reading on the torque cassette meets with the standards.
3) When the reading is higher than the standards : Move the spring toward direction Ⓐ.
   When the reading is less than the standards : Move the spring toward direction Ⓑ.

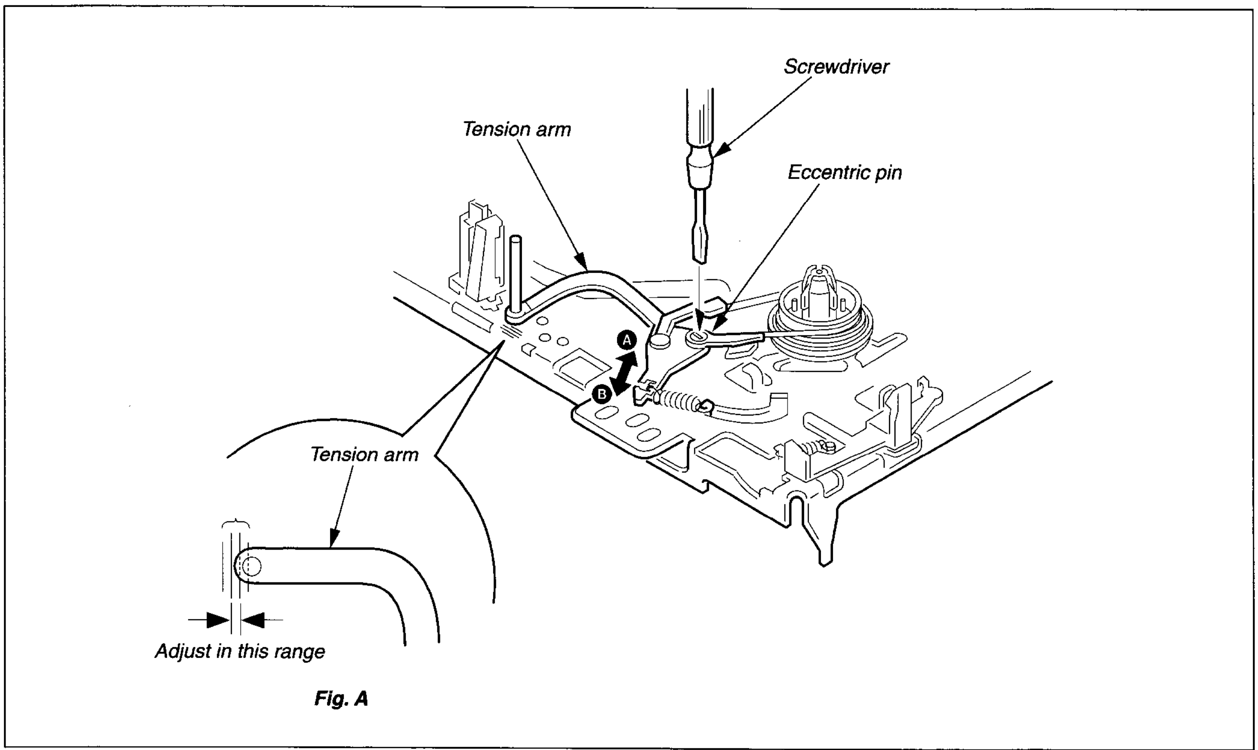


Fig. 4-1

4-1-2. CHECKING THE TENSION AND TORQUE

Purpose : To check that the tension, torque and compression force of the tape take-up section and mobile sections to ensure smooth tape run and achieve standard VTR performance.
If the tape transport is not smooth or problems occur in relation to the tape transport speed, perform the following check.

Mode	Each operation mode
Measuring instrument	Torque cassette VHT-103S, VHT-404S

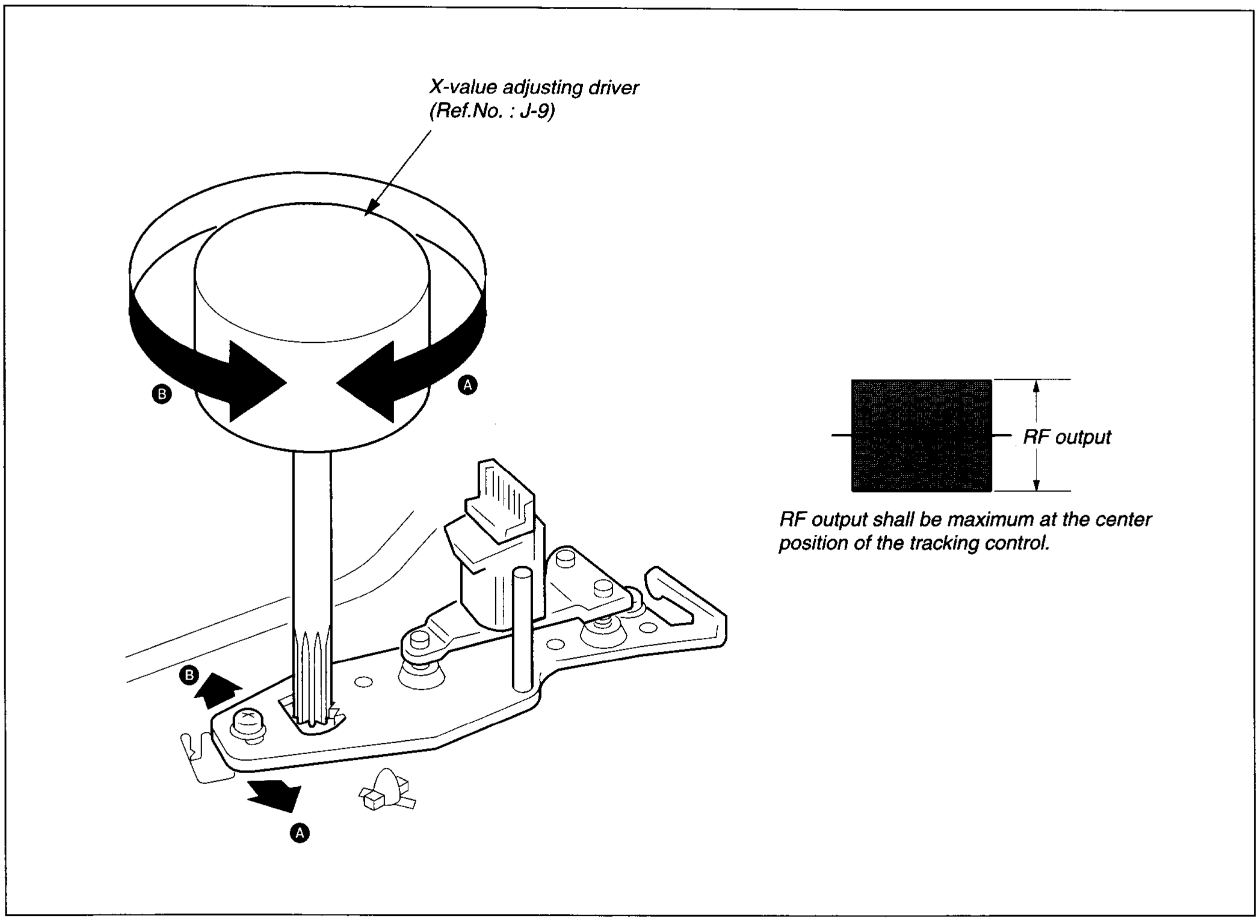
Item	VTR operation mode	Reel to be measured	Measurement value
Review torque	Review	S reel	12.7 to 19.6 mN•m (130 to 200 g•cm)
Take-up torque	Playback	T reel	4.41 to 10.8 mN•m (45 to 110g•cm)
Back tension torque	Playback	S reel	See section 4-1-1.

4-1-3. X-VALUE ADJUSTMENT (Using the tape having the version No.)

Purpose: To obtain compatibility with other VCRs.

Precaution: Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape: KRV-52NE (NTSC)/ 52PL(PAL)
Measuring instrument	Oscilloscope TIME/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH1: Connector PB RF pin for RF PC board check CH2: Connector RF SWP pin for RF PC board check
Adjustment locations	ACE base assembly



RF output shall be maximum at the center position of the tracking control.

Fig. 4-2

[Adjustment Method]

Set the tracking control at the center position. For the VCRs equipped with standard gap video heads, set the ACE head position with X-value adjusting driver where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the ACE head position with X-value adjusting driver both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.

* TYPE OF DRUM

DZH-68D
DZH-71D
DZH-77A
DZH-78A
DZH-78B
DZH-89A
DZH-90A
DZH-91A
DZH-92A

1. Adjusting X-value (Using the tape having the version No.)

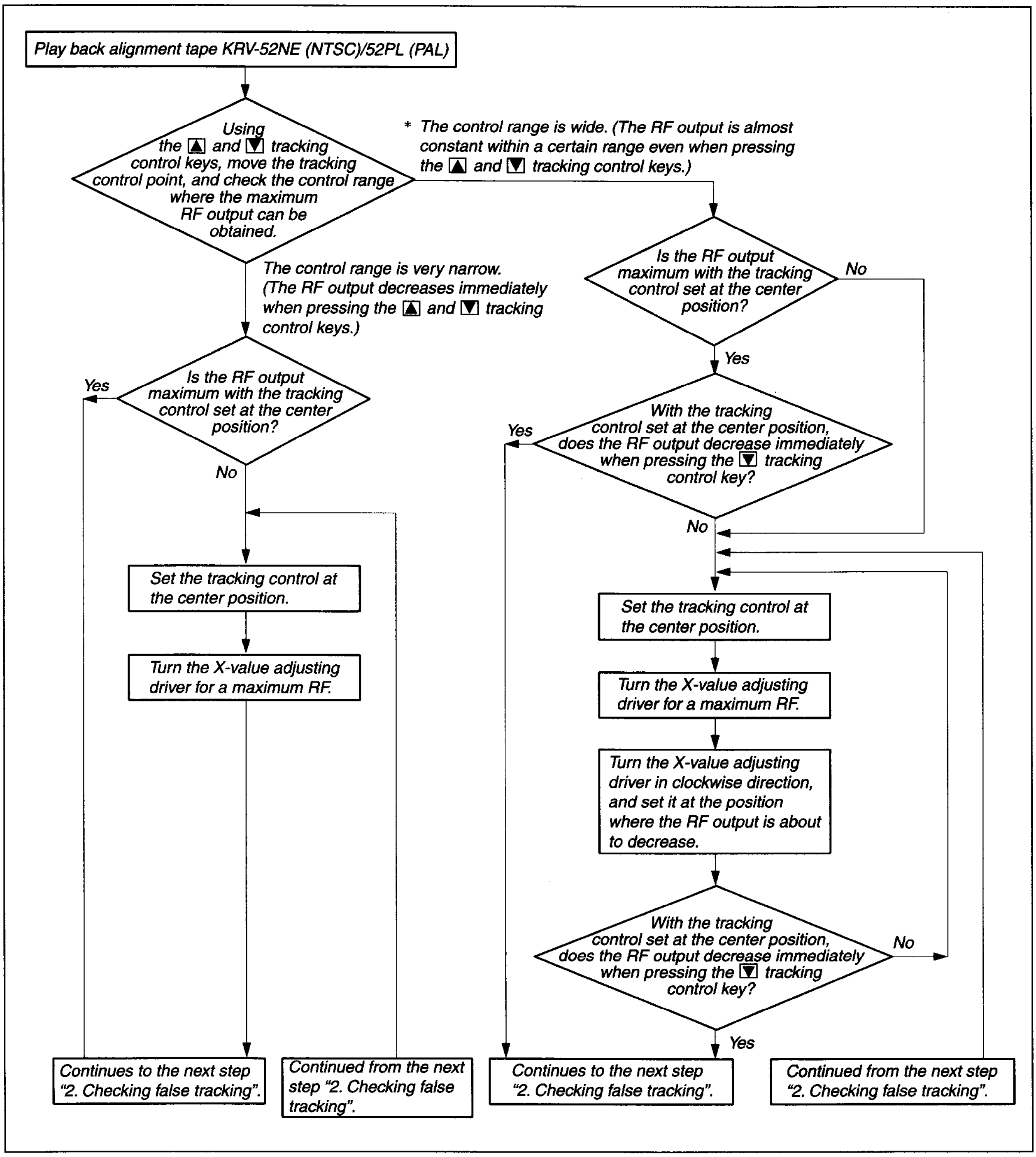
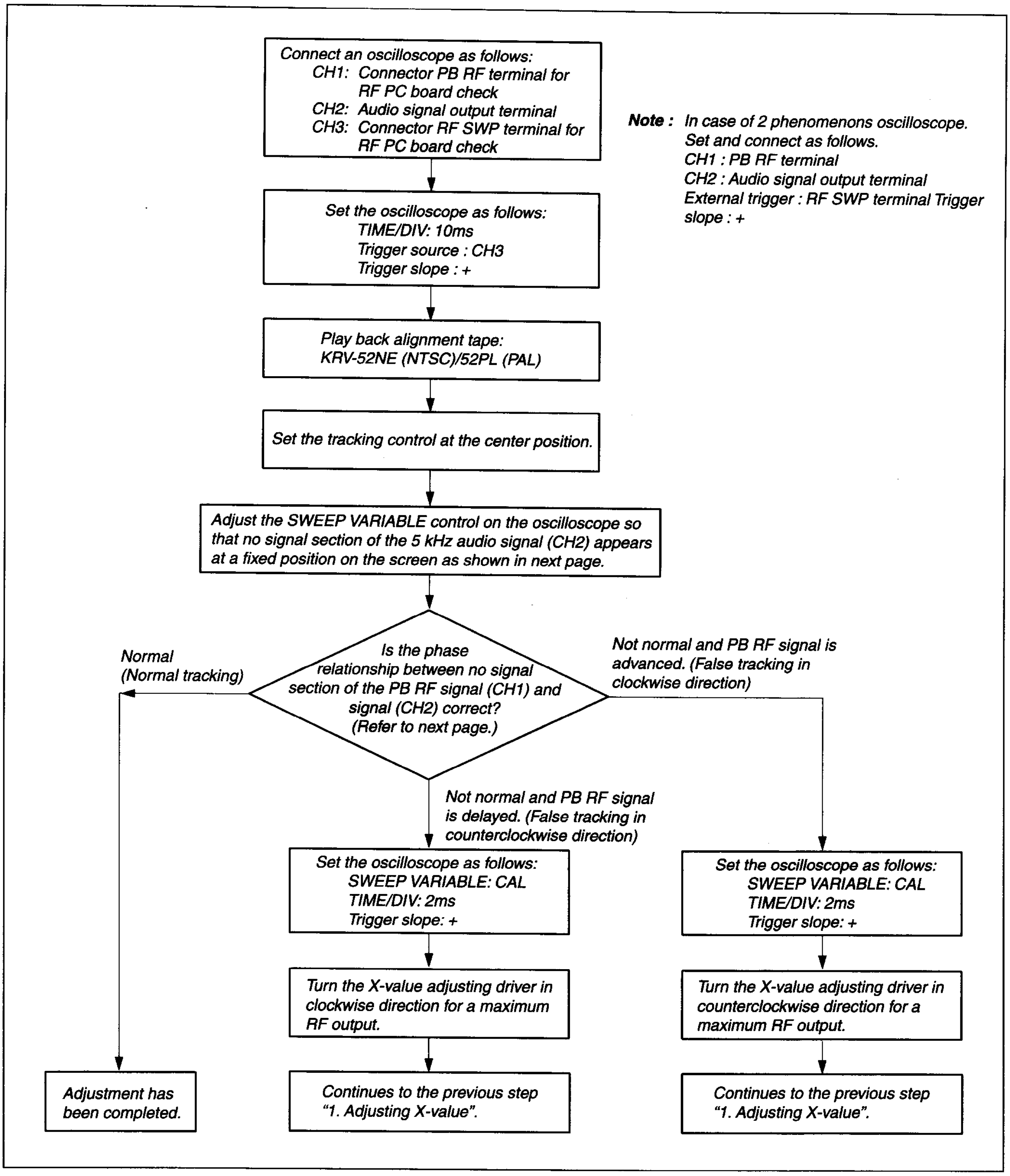

Play back alignment tape KRV-52NE (NTSC)/52PL (PAL)
Using the ▲ and ▼ tracking control keys, move the tracking control point, and check the control range where the maximum RF output can be obtained.
* The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Is the RF output maximum with the tracking control set at the center position?
Yes
No
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF.
Continues to the next step "2. Checking false tracking".
Continued from the next step "2. Checking false tracking".
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
Yes
No
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF.
Turn the X-value adjusting driver in clockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
No
Yes
Continues to the next step "2. Checking false tracking".
Continued from the next step "2. Checking false tracking".

Table. 4-1

2. Checking false tracking
(Using the tape having the version No.)



Connect an oscilloscope as follows:
CH1: Connector PB RF terminal for RF PC board check
CH2: Audio signal output terminal
CH3: Connector RF SWP terminal for RF PC board check

Note : *In case of 2 phenomenons oscilloscope.*
Set and connect as follows.
CH1 : PB RF terminal
CH2 : Audio signal output terminal
External trigger : RF SWP terminal Trigger slope : +

Set the oscilloscope as follows:
TIME/DIV: 10ms
Trigger source : CH3
Trigger slope : +

Play back alignment tape:
KRV-52NE (NTSC)/52PL (PAL)

Set the tracking control at the center position.

Adjust the SWEEP VARIABLE control on the oscilloscope so that no signal section of the 5 kHz audio signal (CH2) appears at a fixed position on the screen as shown in next page.

Is the phase relationship between no signal section of the PB RF signal (CH1) and signal (CH2) correct? (Refer to next page.)

Normal (Normal tracking)
Not normal and PB RF signal is advanced. (False tracking in clockwise direction)
Not normal and PB RF signal is delayed. (False tracking in counterclockwise direction)

Adjustment has been completed.

Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +

Turn the X-value adjusting driver in clockwise direction for a maximum RF output.

Continues to the previous step "1. Adjusting X-value".

Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +

Turn the X-value adjusting driver in counterclockwise direction for a maximum RF output.

Continues to the previous step "1. Adjusting X-value".

Table. 4-2

Using the tape having the version No.

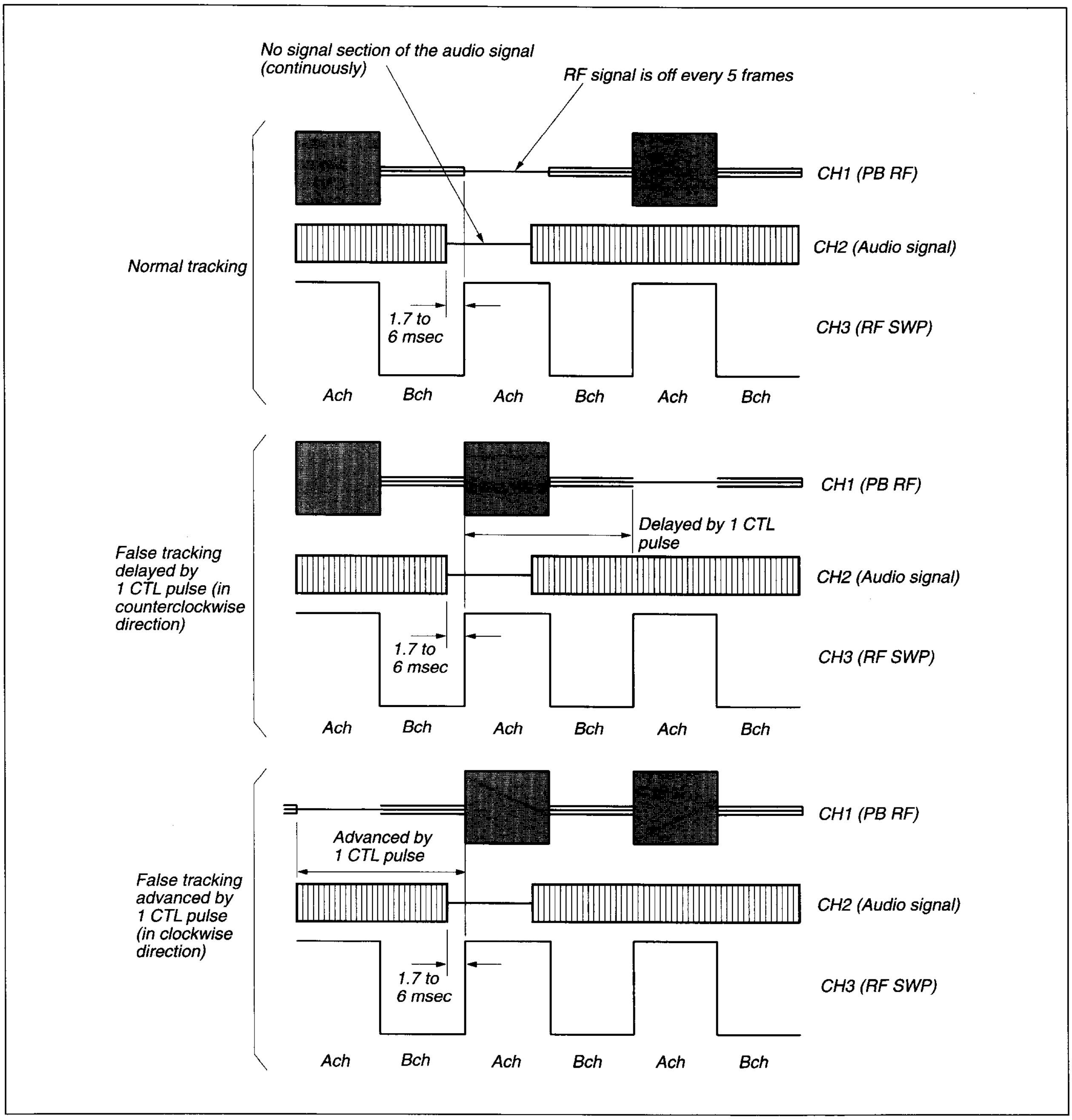

No signal section of the audio signal (continuously)
RF signal is off every 5 frames
Normal tracking
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch
False tracking delayed by 1 CTL pulse (in counterclockwise direction)
Delayed by 1 CTL pulse
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch
False tracking advanced by 1 CTL pulse (in clockwise direction)
Advanced by 1 CTL pulse
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch

Table. 4-3

[Adjustment Method (*For the VCRs Equipped with Narrow Gap Video Heads)]

Set the tracking control at the center position. Set the ACE head position with X-value adjusting driver both where a maximum RF output is obtained and where the RF output decreases immediately when the ▲ tracking control key is pressed.

* TYPE OF DRUM
DZH-98A

1. Adjusting X-value (Using the tape having the version No.)

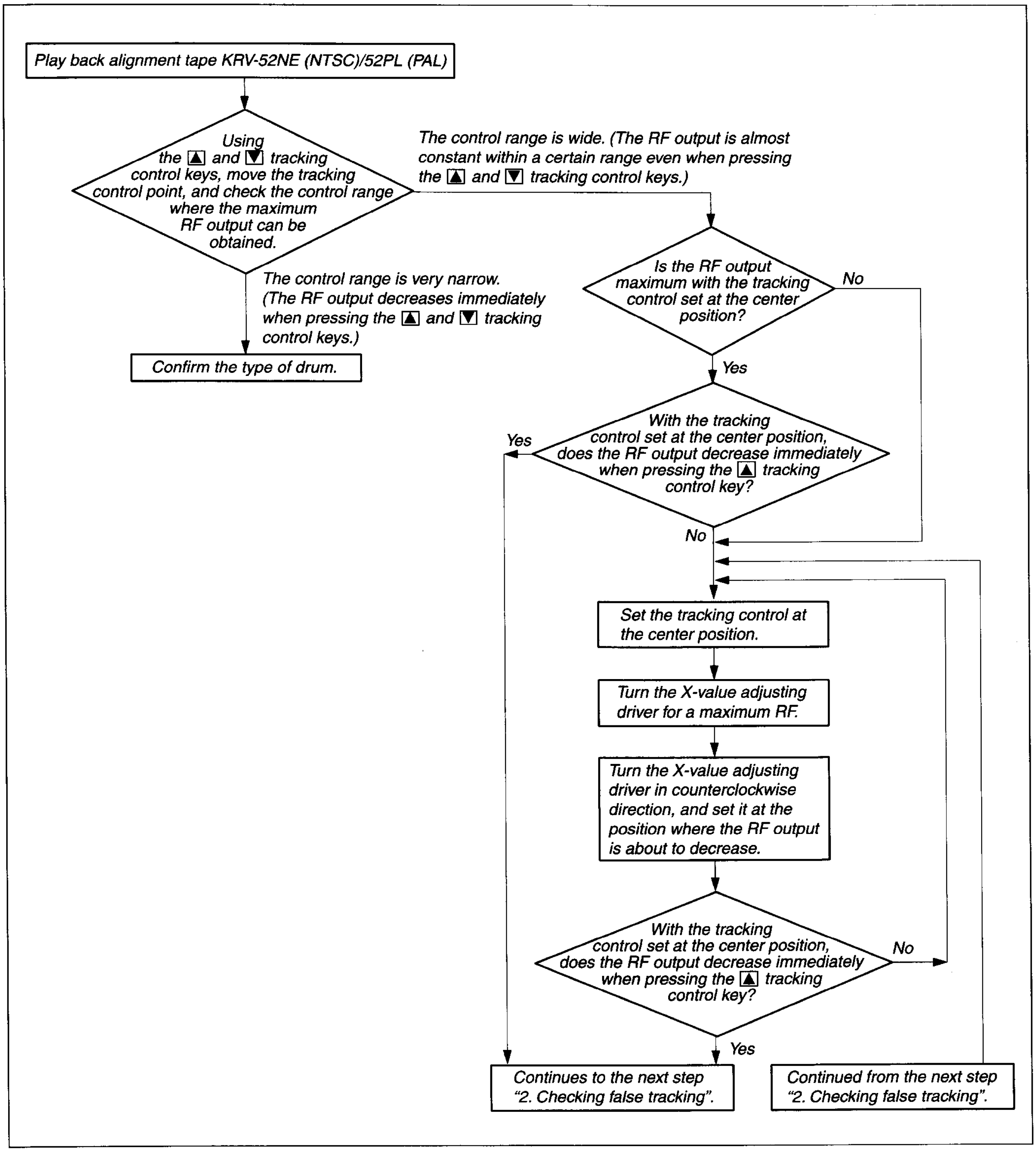
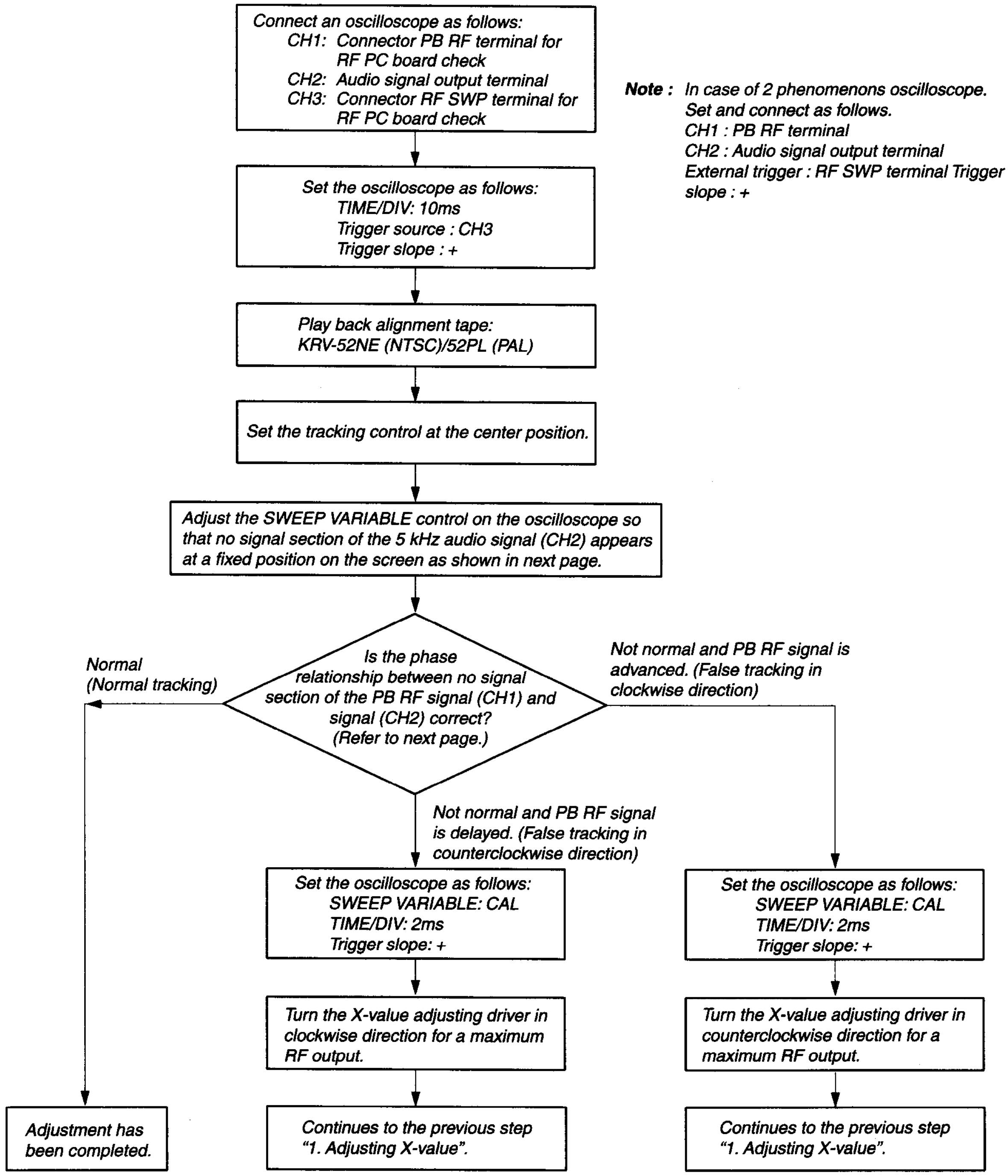

Play back alignment tape KRV-52NE (NTSC)/52PL (PAL)
Using the ▲ and ▼ tracking control keys, move the tracking control point, and check the control range where the maximum RF output can be obtained.
The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Confirm the type of drum.
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
Yes
No
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF.
Turn the X-value adjusting driver in counterclockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
No
Yes
Continues to the next step "2. Checking false tracking".
Continued from the next step "2. Checking false tracking".

Table. 4-4

2. Checking false tracking
(Using the tape having the version No.)



Connect an oscilloscope as follows:
CH1: Connector PB RF terminal for RF PC board check
CH2: Audio signal output terminal
CH3: Connector RF SWP terminal for RF PC board check

Set the oscilloscope as follows:
TIME/DIV: 10ms
Trigger source : CH3
Trigger slope : +

Play back alignment tape:
KRV-52NE (NTSC)/52PL (PAL)

Set the tracking control at the center position.

Adjust the SWEEP VARIABLE control on the oscilloscope so that no signal section of the 5 kHz audio signal (CH2) appears at a fixed position on the screen as shown in next page.

Is the phase relationship between no signal section of the PB RF signal (CH1) and signal (CH2) correct? (Refer to next page.)

Normal (Normal tracking)

Adjustment has been completed.

Not normal and PB RF signal is delayed. (False tracking in counterclockwise direction)

Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +

Turn the X-value adjusting driver in clockwise direction for a maximum RF output.

Continues to the previous step "1. Adjusting X-value".

Not normal and PB RF signal is advanced. (False tracking in clockwise direction)

Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +

Turn the X-value adjusting driver in counterclockwise direction for a maximum RF output.

Continues to the previous step "1. Adjusting X-value".

Note : *In case of 2 phenomenons oscilloscope. Set and connect as follows.*
CH1 : PB RF terminal
CH2 : Audio signal output terminal
External trigger : RF SWP terminal Trigger slope : +

Table. 4-5

Using the tape having the version No.

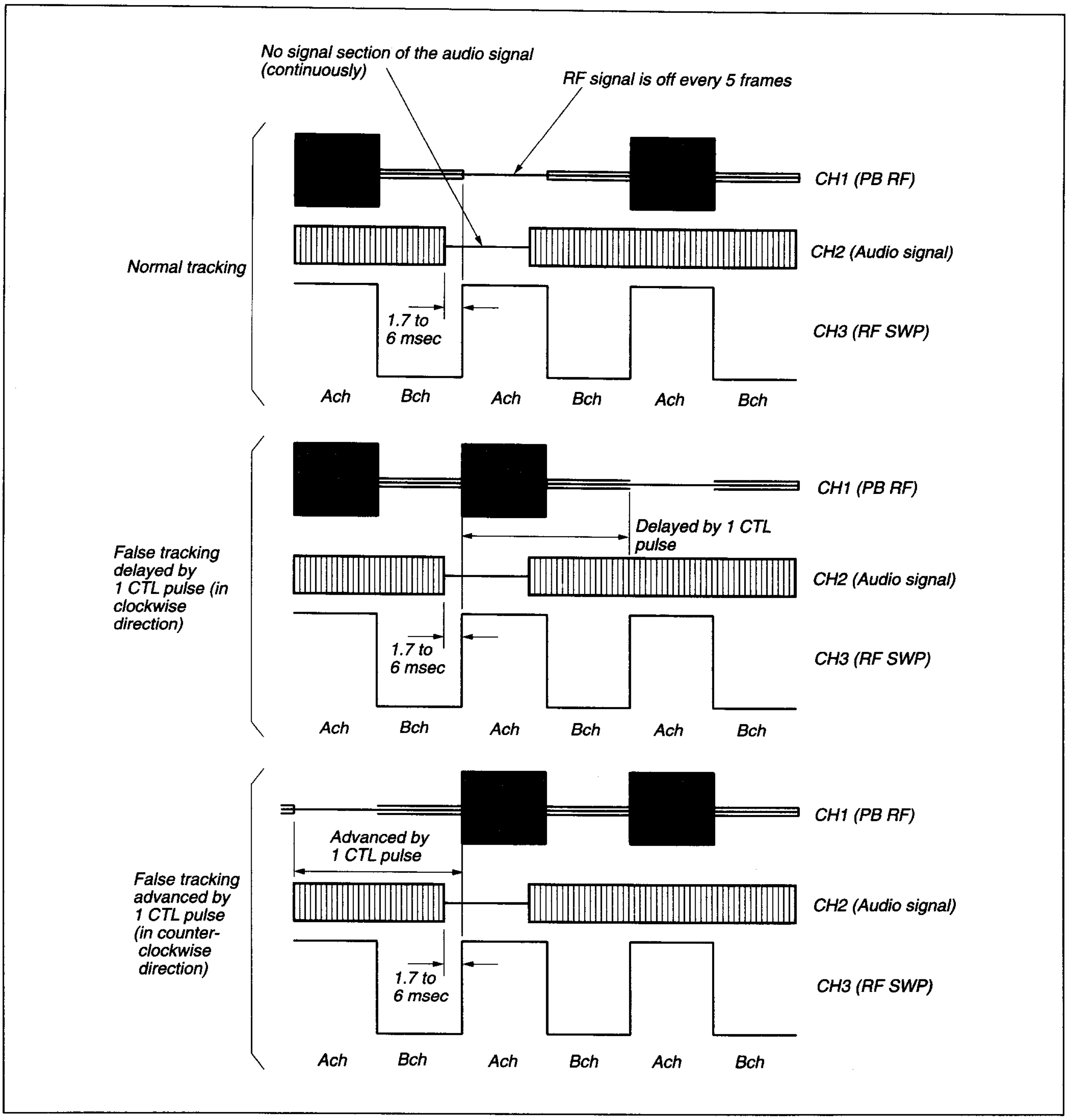

No signal section of the audio signal (continuously)
RF signal is off every 5 frames
Normal tracking
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch
False tracking delayed by 1 CTL pulse (in clockwise direction)
Delayed by 1 CTL pulse
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch
False tracking advanced by 1 CTL pulse (in counter-clockwise direction)
Advanced by 1 CTL pulse
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
1.7 to 6 msec
Ach
Bch
Ach
Bch
Ach
Bch

Table. 4-6

3-22. CAM MOTOR ASSEMBLY, LIMITER SELECTION ARM

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove worm wheel. (Refer to 3-13.)
5) Remove pulley gear assembly with clutch gear. (Refer to 3-19.)
6) Remove and reel direct assembly. (Refer to 3-20.)
7) Remove cam motor retainer ① in the arrow Ⓑ while pushing its claw in the arrow Ⓐ direction.
8) Then cam motor assembly ② is out of place.
9) Remove the boss of limiter selection arm ③ from the hole on the mechanical chassis by pushing in the arrow Ⓒ direction and push it in the arrow Ⓓ direction and remove it in the arrow Ⓔ direction.

[Note on Mounting]

- Before attaching cam motor assembly ②, confirm the specified locations are coated with grease SG-646 (Ref. No. J-6).

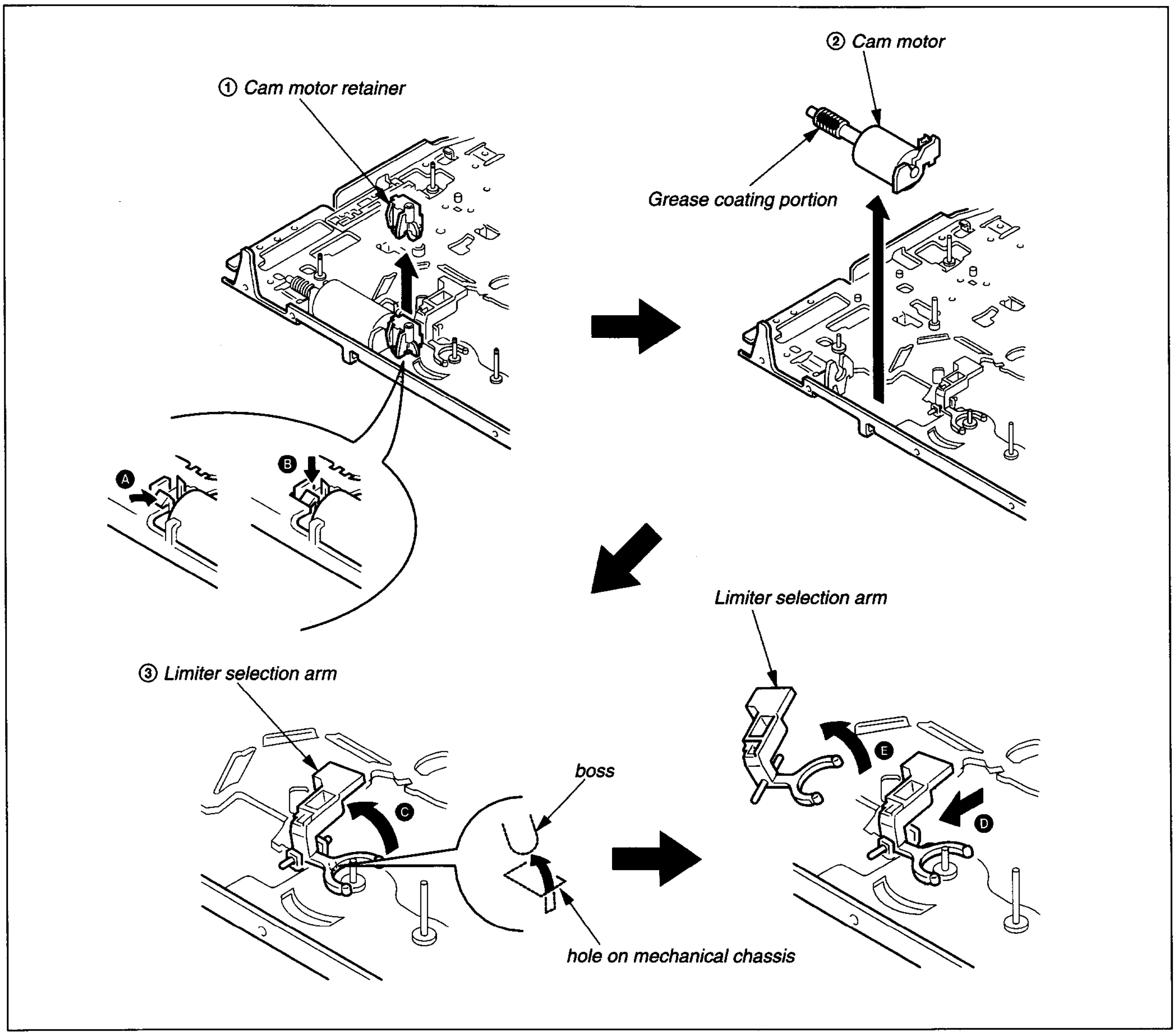

② Cam motor
① Cam motor retainer
Grease coating portion
Ⓐ
Ⓑ
Limiter selection arm
③ Limiter selection arm
boss
Ⓒ
Ⓔ
Ⓓ
hole on mechanical chassis

Fig. 3-27

Reference

• X-VALUE ADJUSTMENT
(Using KRV-52NE having no version No.)

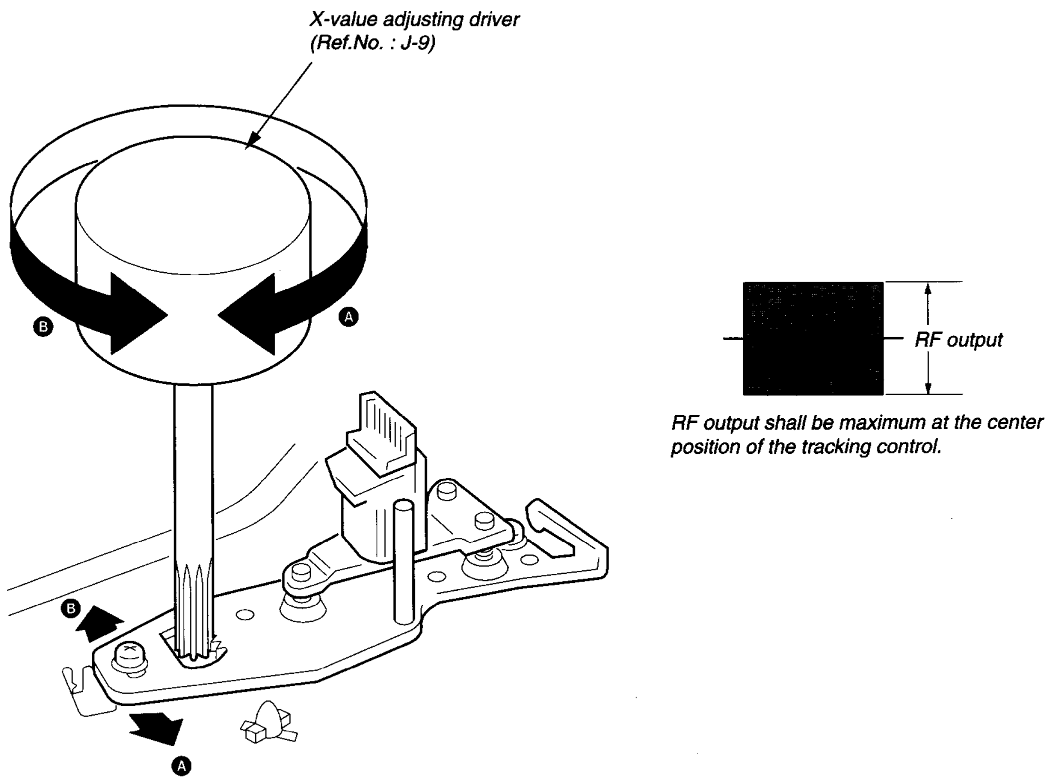
Purpose : To obtain compatibility with other VCRs.

Precaution : Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys. Press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape: KRV-52NE (For NTSC having no version No.)
Measuring instrument	Oscilloscope TIME/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH1: Connector PB RF pin for RF PC board check CH2 : Connector RF SWP pin for RF PC board check
Adjustment locations	ACE base assembly

[Adjustment Method]

Set the tracking control at the center position. For the VCRs equipped with standard gap video heads, set the X-value adjustment screw where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the X-value adjustment screw both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.



X-value adjusting driver
(Ref.No. : J-9)

RF output shall be maximum at the center position of the tracking control.

Fig. 4-3

X-VALUE ADJUSTMENT
(Using the tape having no version No.)

* TYPE OF DRUM

DZH-68D	DZH-89A
DZH-71D	DZH-90A
DZH-77A	DZH-91A
DZH-78A	DZH-92A
DZH-78B	

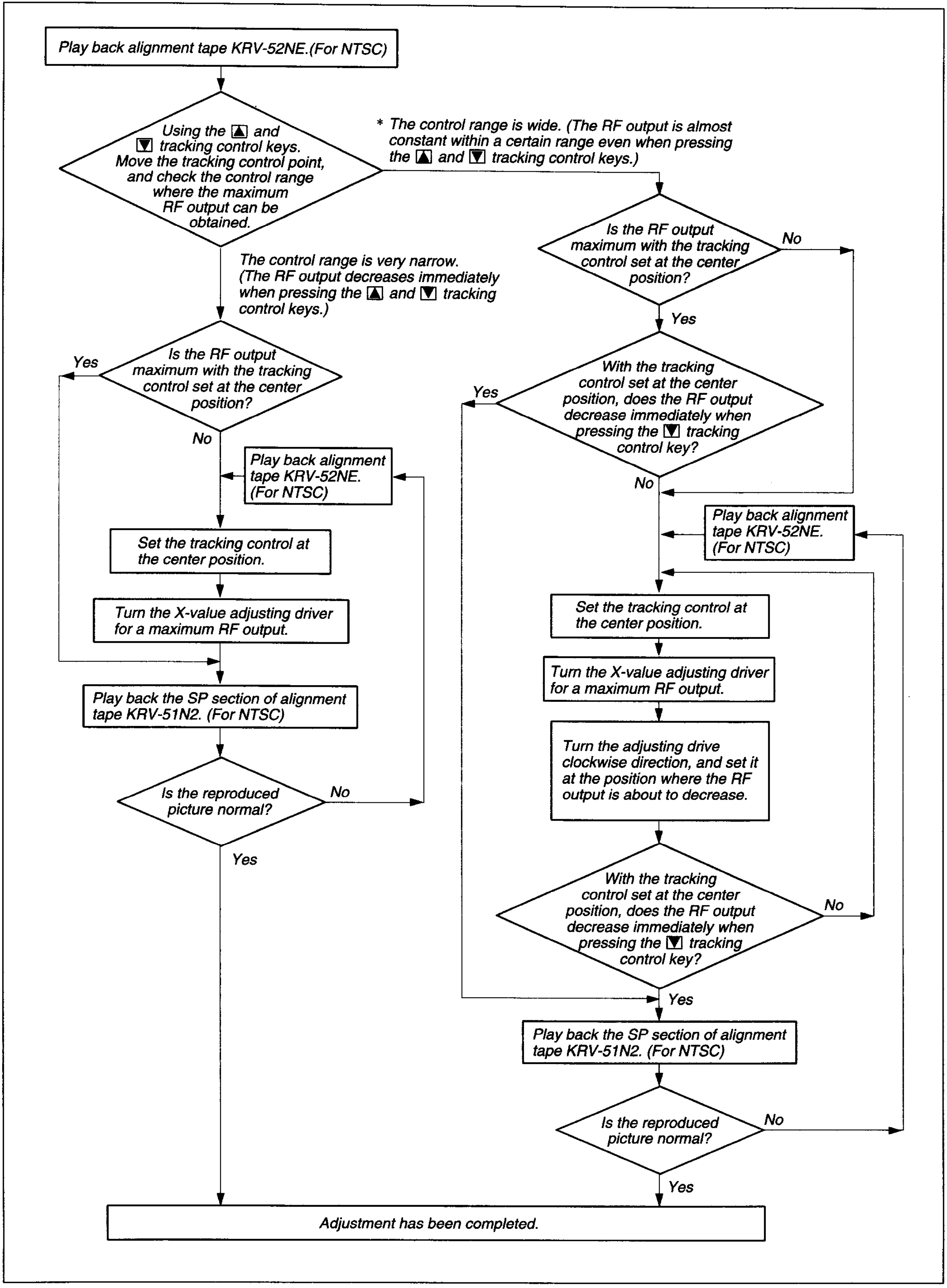

Play back alignment tape KRV-52NE.(For NTSC)
Using the ▲ and ▼ tracking control keys. Move the tracking control point, and check the control range where the maximum RF output can be obtained.
* The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Is the RF output maximum with the tracking control set at the center position?
Yes
No
Play back alignment tape KRV-52NE. (For NTSC)
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF output.
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
Yes
No
Play back alignment tape KRV-52NE. (For NTSC)
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF output.
Turn the adjusting drive clockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
No
Yes
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
Adjustment has been completed.

Table. 4-7

[Adjustment Method (*For the VCRs Equipped with Narrow Gap Video Heads)]

Set the tracking control at the center position. Set the ACE head position with X-value adjusting driver both where a maximum RF output is obtained and where the RF output decreases immediately when the ▲ tracking control key is pressed.

* TYPE OF DRUM
DZH-98A

Using the tape having the version No.

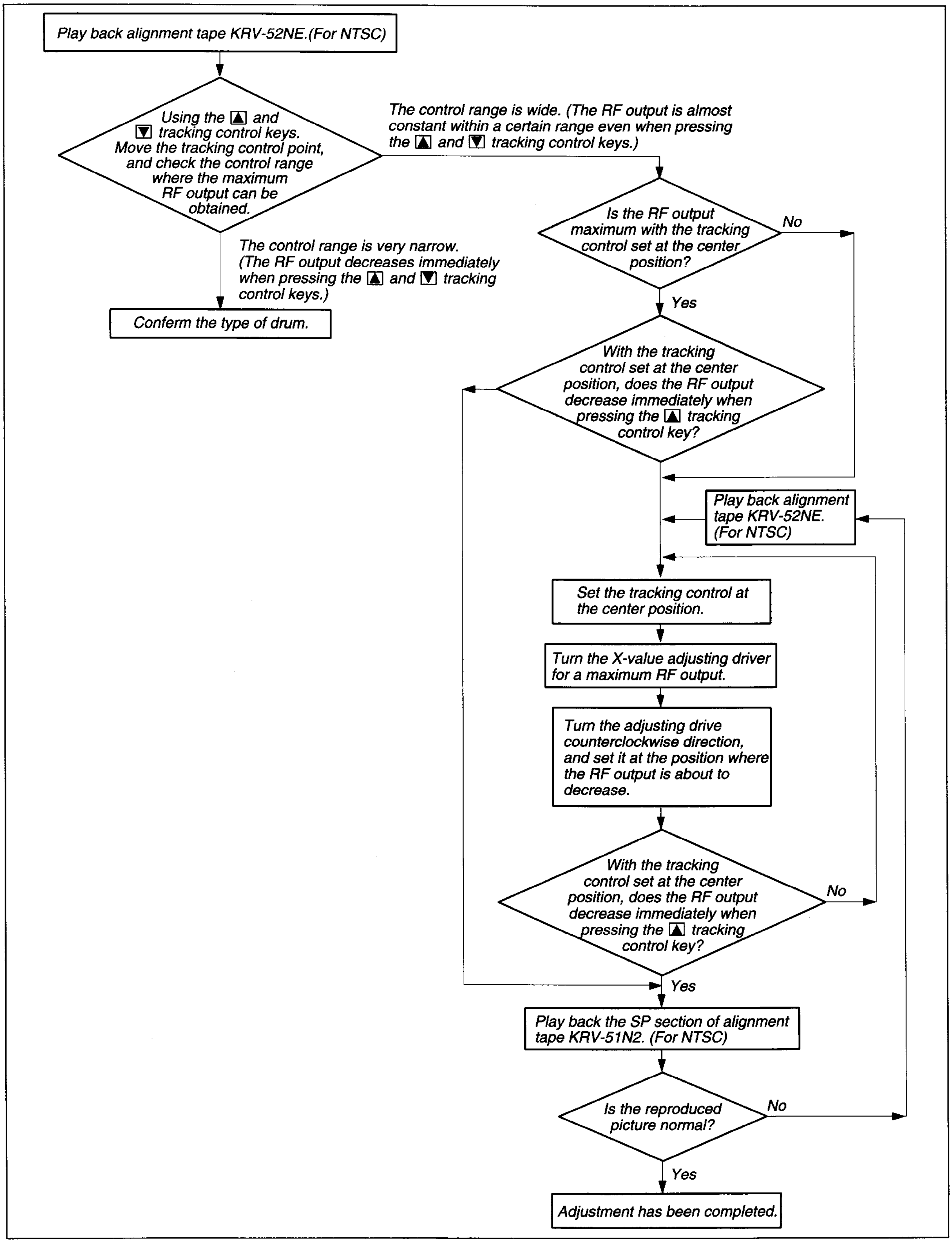

Play back alignment tape KRV-52NE.(For NTSC)
Using the ▲ and ▼ tracking control keys. Move the tracking control point, and check the control range where the maximum RF output can be obtained.
The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Conferm the type of drum.
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
Play back alignment tape KRV-52NE. (For NTSC)
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF output.
Turn the adjusting drive counterclockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
No
Yes
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
Adjustment has been completed.

Table. 4-9

4-1-4. HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6

Mode	Playback
Signal	Alignment tape: KRV-52NE (NTSC)/52PL (PAL)
Measuring instrument	Oscilloscope TIME/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH1: Connector PB RF pin for RF PC board check CH2: Connector RF SWP pin for RF PC board check
Adjustment locations	Height adjustment screw for No. 3 tape guide roller Height adjustment screw for No. 6 tape guide roller

[Adjustment Method]

The following adjustment shall be carried out after completed Section 4-1-2. X-VALUE ADJUSTMENT.

1) Deactivate the automatic tracking control, and set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).
2) Check if the RF output changes in amplitude by pressing the tracking control key. The RF output should change periodically (changes from a minimum amplitude to a maximum amplitude, and to the minimum amplitude again).

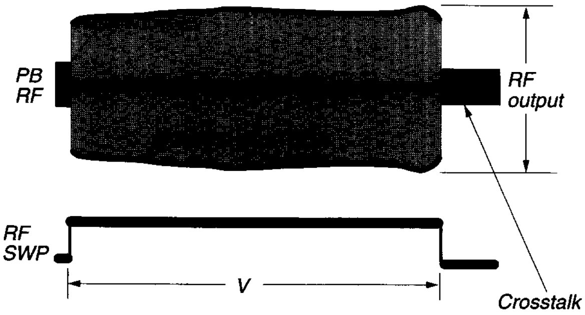
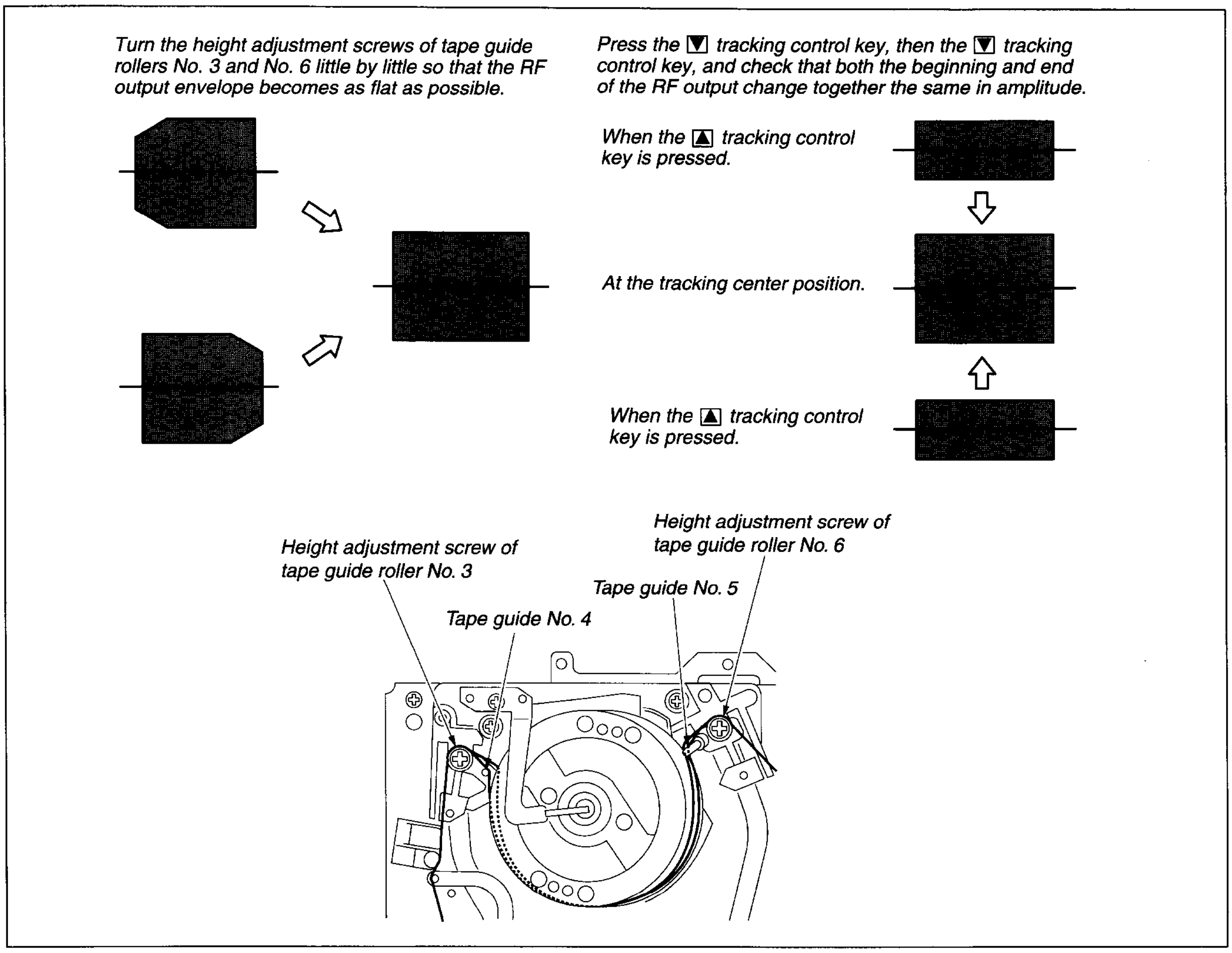

PB
RF
RF
output
RF
SWP
V
Crosstalk

Fig. 4-4

3) Turn the height adjustment screws of tape guide rollers No. 3 and No. 6 so that the RF output envelope becomes as flat as possible.
4) Press the ▲ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.
5) Press the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.



Turn the height adjustment screws of tape guide rollers No. 3 and No. 6 little by little so that the RF output envelope becomes as flat as possible.

Press the ▼ tracking control key, then the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.

When the ▲ tracking control key is pressed.
At the tracking center position.
When the ▲ tracking control key is pressed.
Height adjustment screw of tape guide roller No. 3
Height adjustment screw of tape guide roller No. 6
Tape guide No. 5
Tape guide No. 4

Fig. 4-5

4-1-5. ACE HEAD ASSEMBLY HEIGHT AND AZIMUTH ADJUSTMENT

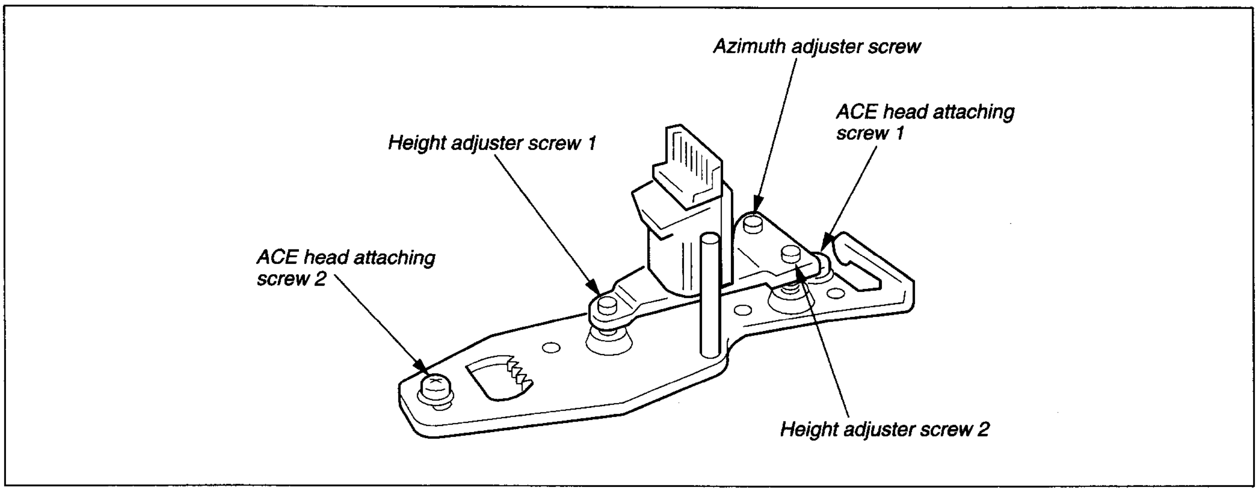

Azimuth adjuster screw
ACE head attaching screw 1
Height adjuster screw 1
ACE head attaching screw 2
Height adjuster screw 2

Fig. 4-6

Mode	Playback
Signal	Alignment tape: (5kHz) KRV-52NE (NTSC)/52PL (PAL)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw, Height adjuster screws 1 and 2.

[Adjustment Method]

1) Adjust the height as shown in the figure with turning the height adjuster screws 1 and 2, and the azimuth adjuster screw in the same direction, the same degree gradually.

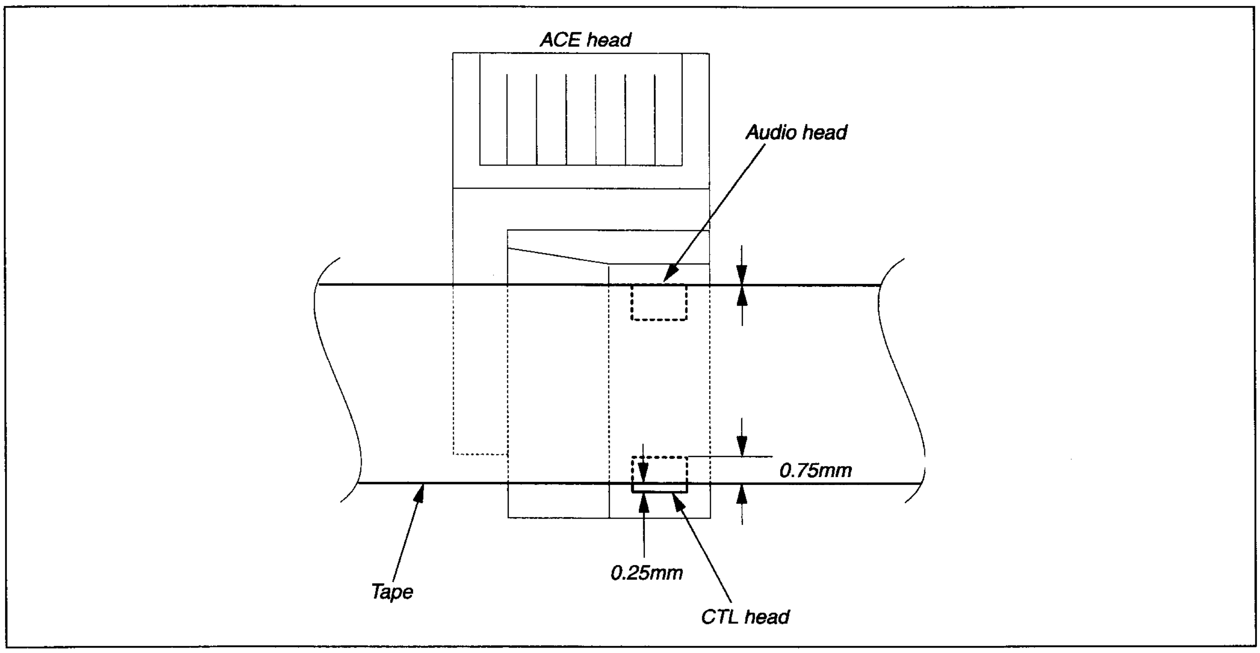

ACE head
Audio head
0.75mm
Tape
0.25mm
CTL head

Fig. 4-7

2) Alternately adjust the azimuth adjuster screw to make A maximum and B minimum. (To maintain even audio output at maximum with minimum deviation.)
3) Perform section 4-1-2. X-VALUE ADJUSTMENT.
4) Tighten ACE head attaching screw 2. (Torque: More than 0.29 N•m (3.0 kg•cm)).

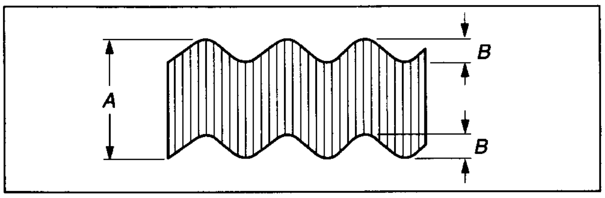


Fig. 4-8

4-1-6. X-VALUE FINE ADJUSTMENT

The procedure is the same as the item 4-1-3. Please refer to pages 37 to 46.

4-1-7. HEIGHT ADJUSTMENT OF GUIDE ROLLER NO. 8

Note : Applicable to the set having TG8 height adjusting screw as shown in the figure. Do not adjust when TG8 height adjusting screw is not attached.

Mode	Playback
Signal	Any signal on thin tape (T-160 or the like) near the tape top.
Adjustment location	TG8 height adjusting screw

[Adjustment Method]

1) Confirm there is no wrinkles of tape between TG8 and capstan and no tape curl at the upper or the lower flanges of TG8 during 10 seconds CUE running.
2) When there is curls or wrinkles, adjust with TG8 height adjusting screw.
3) Confirm there is no wrinkles of tape between TG8 and capstan and no tape curl at the upper or the lower flanges of TG8 during 8 seconds REV running.
4) When there is curls or wrinkles, adjust with TG8 height adjusting screw.

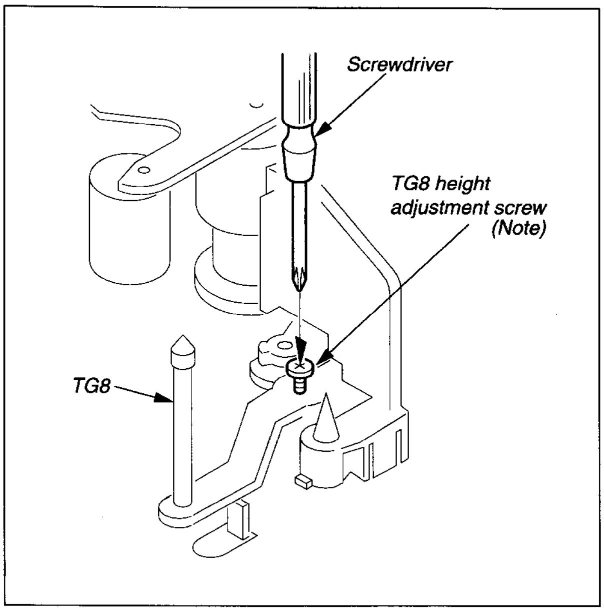


Fig. 4-9

4-1-8. CHECKING THE LINEARITY AND FLUCTUATION OF THE RF OUTPUT

1) Set the RF output to the maximum level using the tracking buttons.

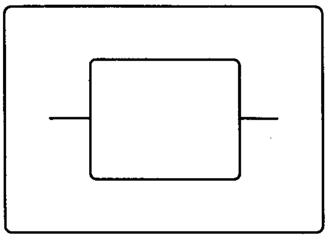


Fig. 4-10-1

2) Perform fine adjustment of the voltage level range of the oscilloscope, adjust the RF output deviation to within 6 gradations.

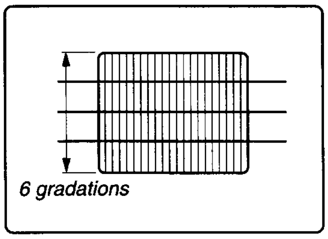


Fig. 4-10-2

3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 4 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.

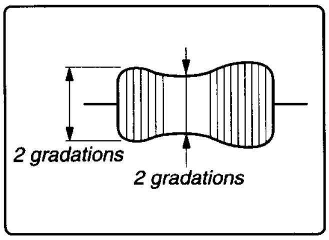


Fig. 4-10-3

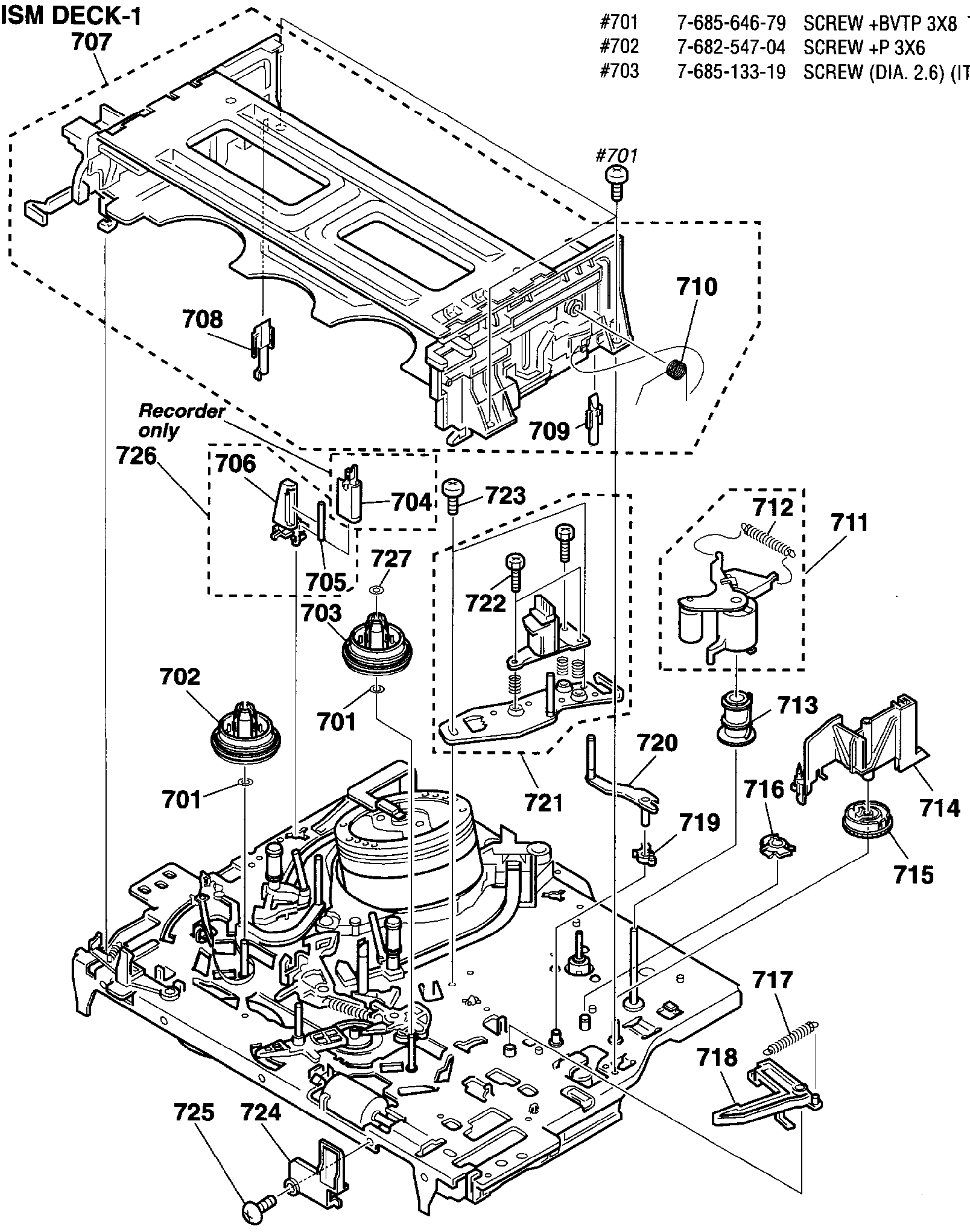
5) Check that RF output fluctuation between minimum and maximum levels is within 13%.

5. EXPLODED VIEWS

Note:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

5-1. MECHANISM DECK-1

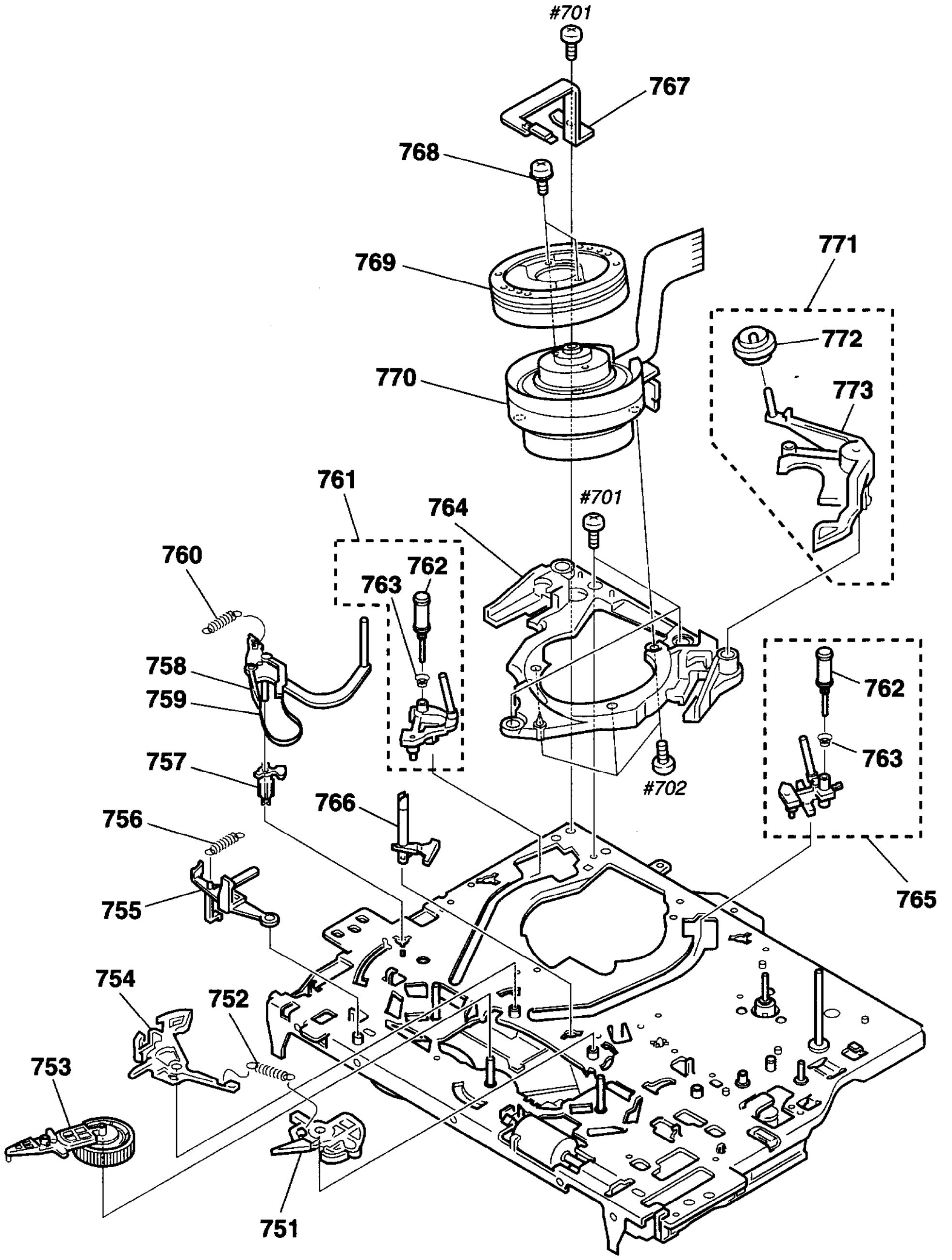


****
HARDWARE LIST
****

#701	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#702	7-682-547-04	SCREW +P 3X6
#703	7-685-133-19	SCREW (DIA. 2.6) (IT3B)

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
701	3-977-509-01	WASHER, THRUST		715	3-977-441-01	GEAR, PINCH PRESSING	
702	3-977-507-01	TABLE, REEL (S) (GRAY)		716	3-977-445-01	GEAR, TG8 ARM DRIVING	
703	3-977-508-01	TABLE, REEL (T) (BLACK)		717	3-977-465-01	SPRING,EXTENSION(RVS BRAKE)	
704	1-500-144-11	HEAD, FE (RECORDER)		718	X-3947-582-1	ARM ASSY, RVS BRAKE	
705	3-977-495-01	SHAFT TG2 (RECORDER)		719	3-977-446-01	GEAR, TG8 ARM	
706	3-977-494-01	HOLDER, FEH (RECORDER)		720	X-3947-590-1	TG8 ASSY	
707	A-6759-619-A	FL COMPLETE ASSY BOARD, COMPLETE		721	A-6759-620-A	HEAD BLOCK ASSY, ACE (TDK)	
708	3-977-535-01	PLATE, LUMINOUS(END SENSOR)		722	3-974-556-01	+ HEXA TT 2.6X9 (TAPER)	
709	3-977-536-01	PLATE, LUMINOUS(TOP SENSOR)		723	3-979-508-01	SCREW	
710	3-970-471-01	SPRING (DECK OPEN), TORSION		724	3-978-485-01	PLATE, GUIDE CASSETTE	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH		725	3-696-519-01	+P IT3 SCREW 3X8	
712	3-958-455-01	SPRING (PINCH), TENSION		726	X-3947-817-1	FEH, ASSY (PLAYER)	
713	3-977-447-01	GEAR, ELEVATOR		727	3-977-443-01	WASHER, STOPPER	
714	3-977-514-01	OPENER, LID					

5-2. MECHANISM DECK-2


#701
767
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#701
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#702
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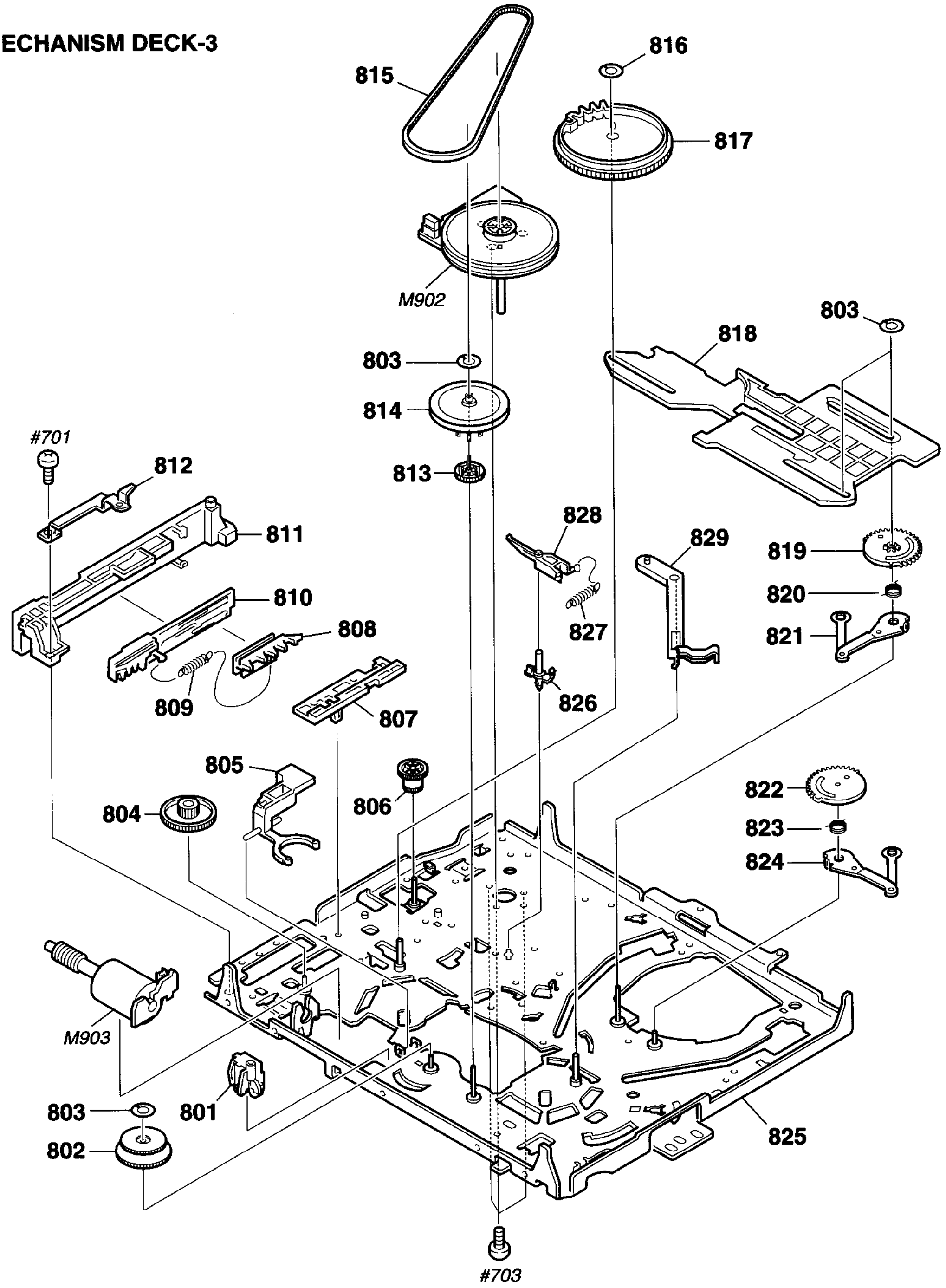
751

Ref. No.	Part No.	Description	Remarks
751	X-3947-581-1	BRAKE ASSY,MAIN(T)	
752	3-977-462-01	SPRING,EXTENTION. (MAIN BRAKE)	
753	X-3947-573-1	ARM ASSY, PENDULUM	
754	X-3947-580-1	BRAKE ASSY, MAIN(S)	
755	3-977-513-01	LEVER, REC. PROOF	
756	3-976-767-01	SPRING, TENS. (REC. PROOF)	
757	3-977-487-01	BOSS, TG1 FULCRUM	
758	X-3947-587-1	TG1 ASSY	
759	X-3947-589-1	BAND ASSY, TG1	
760	3-977-488-01	SPRING (POWER TENSION)	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY	
762	X-3944-378-1	ROLLER ASSY, GUIDE	
763	3-965-178-01	SPRING	
764	3-969-629-01	BASE, DRUM	
765	A-6750-325-A	SHUTTLE (T) BLOCK ASSY	
766	3-977-501-01	PLATE, LUMINOUS	
767	X-3943-899-8	GROUND ASSY, SHAFT	
768	2-643-205-01	SCREW	
769	Refer to the service manual for each model.		
770	Refer to the service manual for each model.		
771	A-6759-614-A	ROLLER BLOCK ASSY, HC	
772	X-3947-255-1	ROLLER ASSY, HC	
773	3-977-537-01	ARM, HC ROLLER	

5-3. MECHANISM DECK-3


815
816
817
M902
803
818
803
814
#701
812
813
811
828
829
819
820
810
808
827
821
809
826
807
805
806
822
804
823
824
M903
803
801
825
802
#703

Ref. No.	Part No.	Description	Remarks
* 801	3-977-437-01	RETAINER,CAM MOTOR	
802	X-3947-584-1	ASSY, REEL DIRECT	
803	3-977-443-01	WASHER, STOPPER	
804	3-977-438-01	WORM - WHEEL	
805	3-977-506-01	ARM, LIMITTER SELECTION	
806	3-977-444-01	GEAR, PINCH TRANSMISSION	
807	3-977-515-01	GUIDE, FL SLIDER	
808	3-977-517-01	PLATE, SLIDE, FL	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)	
810	3-977-518-01	PLATE, LIMITTER, FL	
811	3-977-516-01	HOLDER, FL SLIDER	
812	3-977-877-01	PLATE, RETAINER	
813	3-977-504-01	GEAR, CLUTCH	
814	X-3947-585-1	GEAR ASSY, PULLEY	
815	3-977-510-01	BELT, RUBBER	
816	3-977-440-01	WASHER, STOPPER	
817	3-977-439-01	GEAR, CAM	
818	3-977-442-01	SLIDER	
819	3-977-455-01	GEAR, LOADING(T)	
820	3-977-456-01	SPRING, TORSION (LOAD T)	
821	X-3947-579-1	LEVER ASSY, LOADING(T)	
822	3-977-451-01	GEAR, LOADING(S)	
823	3-977-452-01	SPRING, TORSION (LOAD S)	
824	X-3947-578-1	LEVER ASSY, LOADING(S)	
825	X-3947-576-1	CHASSIS ASSY, MECHANICAL	
826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
827	3-977-467-01	SPRING, CAP BRAKE	
828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
829	3-977-489-01	ARM, TG1 DRIVING	
M902	1-698-971-11	MOTOR, DC	
M903	X-3947-577-1	MOTOR ASSY, CAM	

VHS MECHANICAL ADJUSTMENT MANUAL Ⅵ

9-921-647-13
(Including 9-921-647-11, -12(81))

Sony Corporation
Home A&V Products Company

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